Mature Asset Rehabilitatimon: a different approach required?

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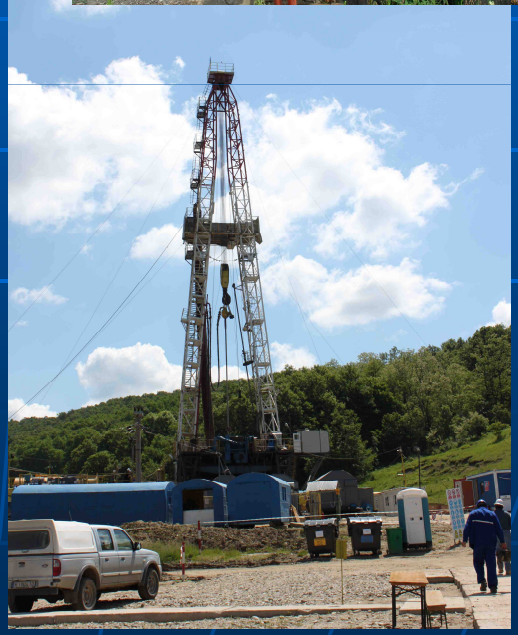
Putting it in the Eastern Europe context

Few important characteristics of Eastern Europe Oil and Gas fields:

1) **Mature:** Majority of the fields have been discovered more than 20 years ago and the overall production is in decline.

2) Medium and Small size fields: 75% of the oil and gas field in Eastern Europe have an ultimate oil recovery of less than 1 MMBOE.

3) **Unconventional Play** is increasingly attracting new players



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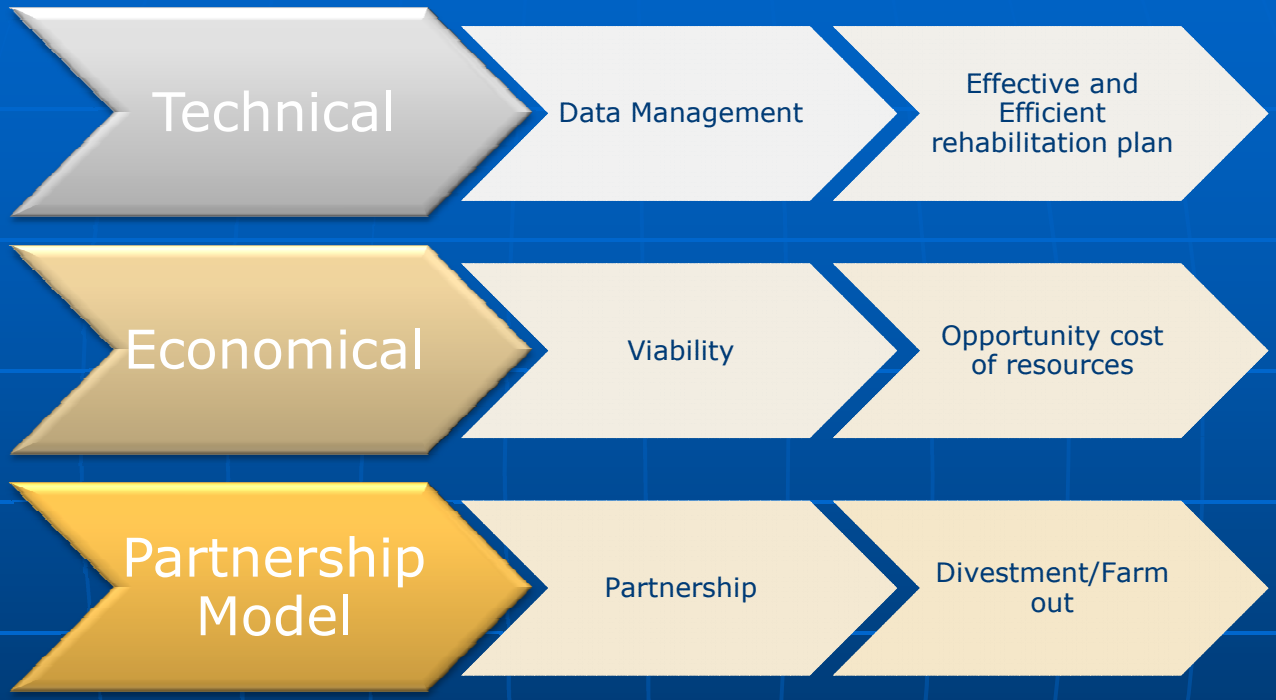
Additional recovery from these Eastern European mature assets will depends:



The information and conclusions in this presentation are based on more than 15 years of experience in mature asset rehabilitation in Eastern Europe

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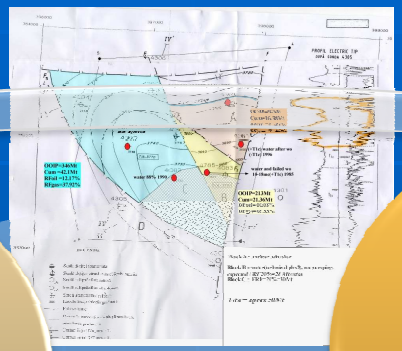
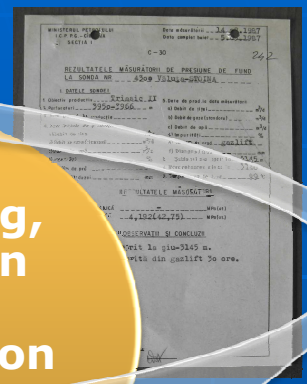
Proper Data management in order to get the story right





Data Acquisition to complete the picture

Data Mining, digitization and Consolidation (Devil is in the details)

Data interpretation with new eyes from a Multi-disciplinary team

Updated reservoir model and reserves

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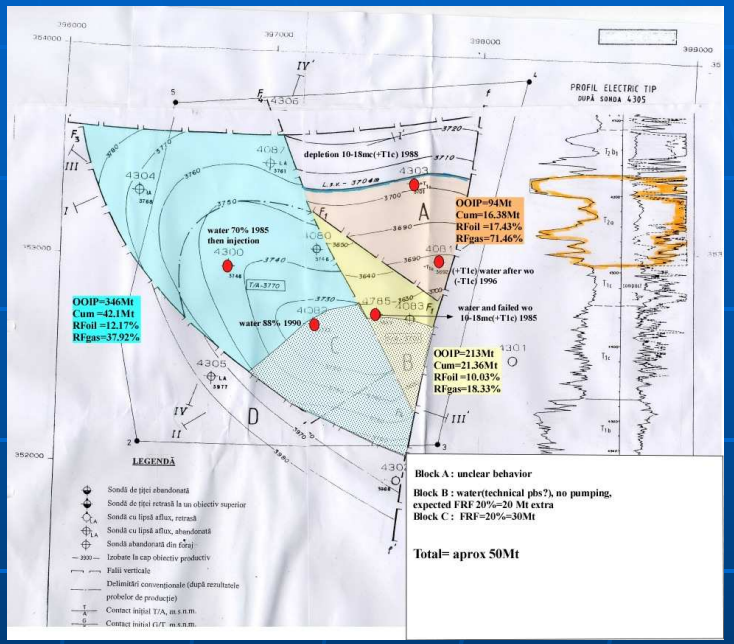
Example of how proper data management can maximize the value of mature HC fields

Expert Petroleum took over few years ago the operatorship of a field that used to be with an incumbent operator for more than 40 years.

The field is deep (4000mtrs) and complex (oil, gas, condensate, 6 reservoirs with very different lithology)

The first year was focusing on data digitization, interview with personnel who had operated the field, data consolidation, data acquisition (3D) and new interpretation



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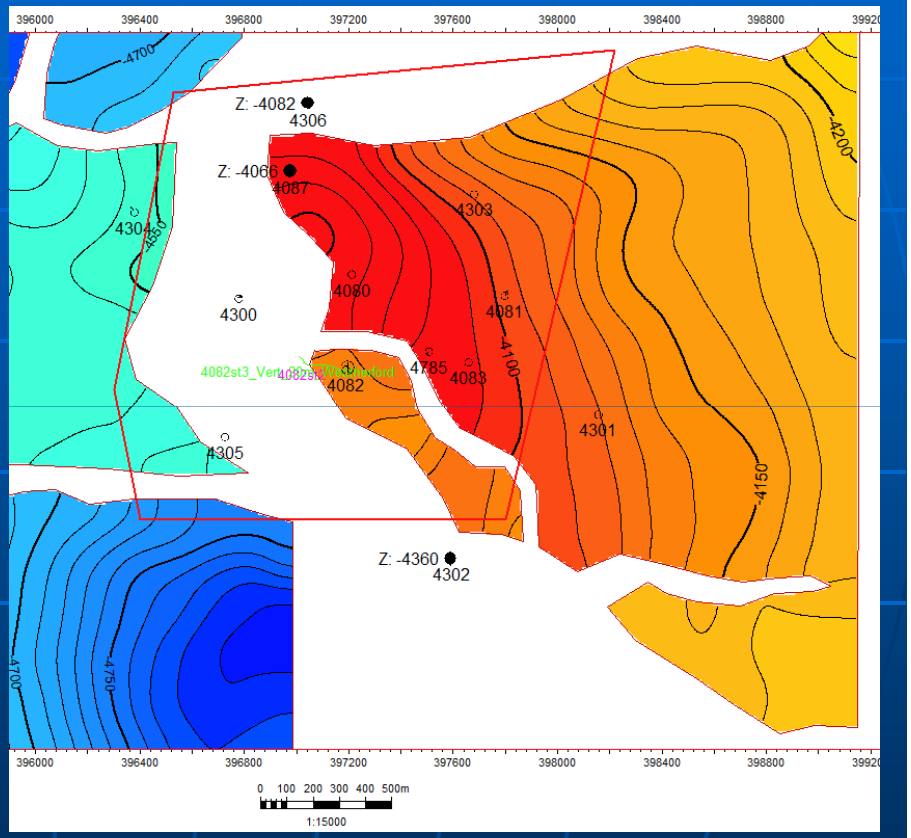
Example of how proper data management can maximize the value of mature HC fields

Based on the new reservoirs model not only the reserves have increased by 50% but most surprisingly by putting together an oil test, barely reported at the time (because it was thought to be part of an existing reservoir) with the new field structure confirmed the discovery of a new deeper reservoir with more than 5MMBBLS of oil reserves



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Effective and Efficient rehabilitation plan

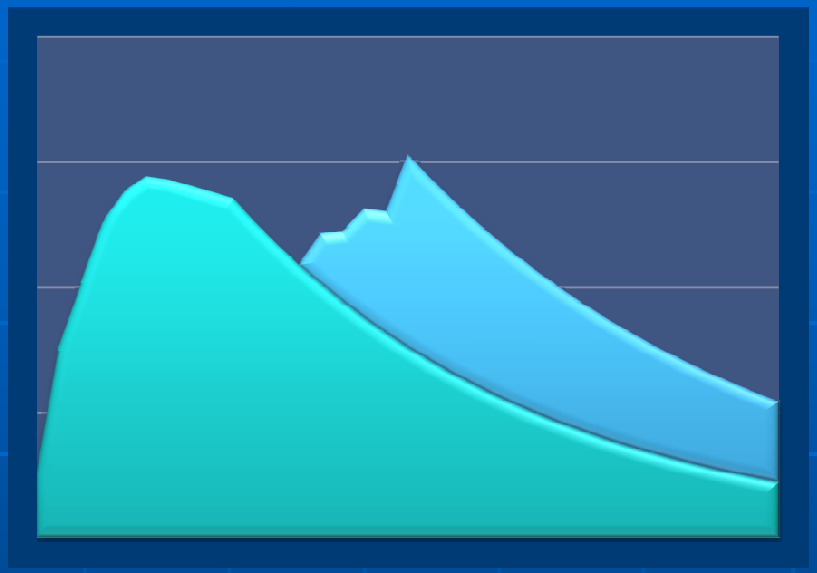
A good rehabilitation plan should be:
Effective: incremental recovery
And
Efficient: Cost and Recovery time

•New technologies should be applied carefully to ensure smooth integration with existing assets

•Techniques include water shut off, Underbalanced and/or horizontal drilling, Surfactant, Water injection, artificial lift,

•Infill drilling is not often needed based on the development of these fields in the past unless existing wells and formation are too damaged

•EOR such as gas, chemical or thermal injection are only used to develop large field



• Most common technical challenge that have to be addressed:
  - Water production
  - Formation Damage
  - Pressure Depletion
  - Completion issues
  - Surface bottleneck

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Economical Challenge

The Economical viability test:
This is is at this stage that most of the mature asset rehabilitation plan finally stopped.
The main reason being that most of the mature assets in Eastern Europe are still owned by NOC or recently privatized NOC.
These are large E&P companies with high Return On Investment requirements due to:
- Important G&A
And
- Opportunity cost to their resources (personnel and finance).

Opportunity Cost example: Which project to mobilize a full engineering team and 15MUSD investment? :

Rehabilitation of a local mature assets with a ROI of x2 over 5 years

OR

Exploration Well in Kurdistan with a potential ROI of x10 over 3 years

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Strategic Challenge for mature fields owners

What's left to maximize the value of these small mature HC fields if they did not pass the economical gate:

- **Reduce investment** in it and let them produce until they are not economical to produce

- **Divest them or farm them out:** More and more E&P companies are reluctant to do that (unless they need cash) as they do not want to give away equity in their assets just in case :
  - -price of HC increase dramatically
  - -opportunities dry up in the future
  - -New play is discovered
  - -Strategic assets for NOC

- **Partnership with a partner that does not take equity**, like a service company: Conflict of interest

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The production Enhancement Contract: A New Approach for mature assets ?

A Production Enhancement Contract is a service contract with the following characteristics :

- Long term 15-30 years contract
- The contractor does not take equity in the field (no reserve booking)
- The contractor makes the investment and get paid by a share of the incremental production
- The contractor manage the field base line in collaboration with the resources owner
- Field Personnel is seconded to the contractor

Such contract can be challenging initially from a legal point of view but they are becoming more and more common: Iraq, Oman, Romania, Hungary soon..

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The production Enhancement Contract:

In order to be successful the contractor must have

✓Strong Subsurface and Reservoir Engineering expertise and capabilities

✓Experience in using fit for purpose technology for mature oilfield assets

✓Excellence in streamlined operations and innovative field re-development using existing infrastructure

✓Strong knowledge of the local environment (laws, regulations…)

✓Adapted cost structure: No unnecessary G&A or exploration cost to recover

✓A service attitude to better comprehends the history of the field management and technical challenges.

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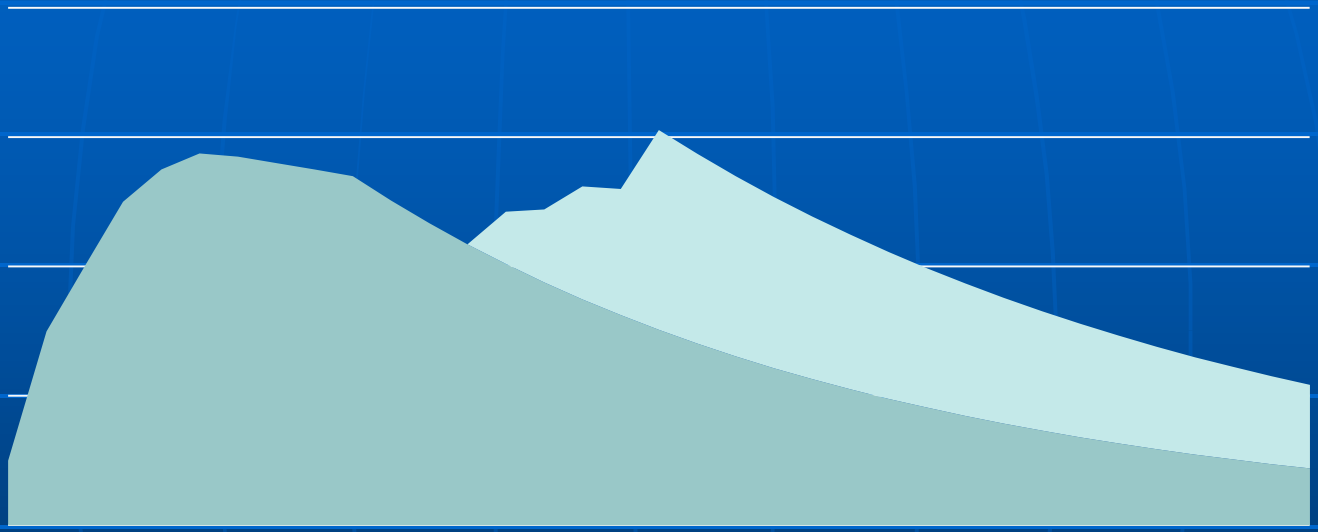
With a new approach there is hope to maximize further mature HC fields in Eastern Europe



Thank you

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