

What's happened in Kurdistan?

“Geology is a science. Geophysics is a
science.
Exploration is a Business”

Our “Iraq” event, 17th November 2009

“We can say Yes, it’s possible to work in Iraq and there are some massive fields waiting to be developed or re-developed. Indeed, you can look at the last 30 or 40 years as having simply interrupted the normal pattern of development in a major hydrocarbon province, namely that the biggest fields get developed first. So once Rumaila, West Qurna and perhaps Kirkuk are ‘in motion’, doesn’t this mean that smaller discoveries in the south of Iraq and exploration in Kurdistan will simply take their place in a conventional ‘queue’ – and wait for a long time??? Doesn’t this mean that shareholders in the Majors and bigger Independents are the ones that are going to be pleased, in the end; those in AIM-sized companies are going to be intensely disappointed?”

Norway – what's this, why this???

<http://www.oedigital.com/drilling/item/15302-gohta-reserves-to-be-reduced-after-appraisal-well>

Oh dear!!!

<http://www.oedigital.com/drilling/item/15302-gohta-reserves-to-be-reduced-after-appraisal-well>

“Lundin Petroleum's latest appraisal well on the Gohta field, in the Barents Sea, has had disappointing results, resulting in a downgrade in the field's resource estimate.....

The Gohta discovery, made in Permian carbonate reservoir rocks in well 7120/1-3 in 2013, was estimated to contain gross contingent resources of between 91-184 MMboe prior to the drilling of well 7120/1-5.

The resource estimate for the discovery will be reduced as a consequence of the latest appraisal well, said Lundin.”

Carbonates in the Barents Sea...maybe that's why.....

“Characteristics of open fractures in carbonate reservoirs and their impact on fluid flow.....”

...Statoil's Research Centre published this:

(I paraphrase)!

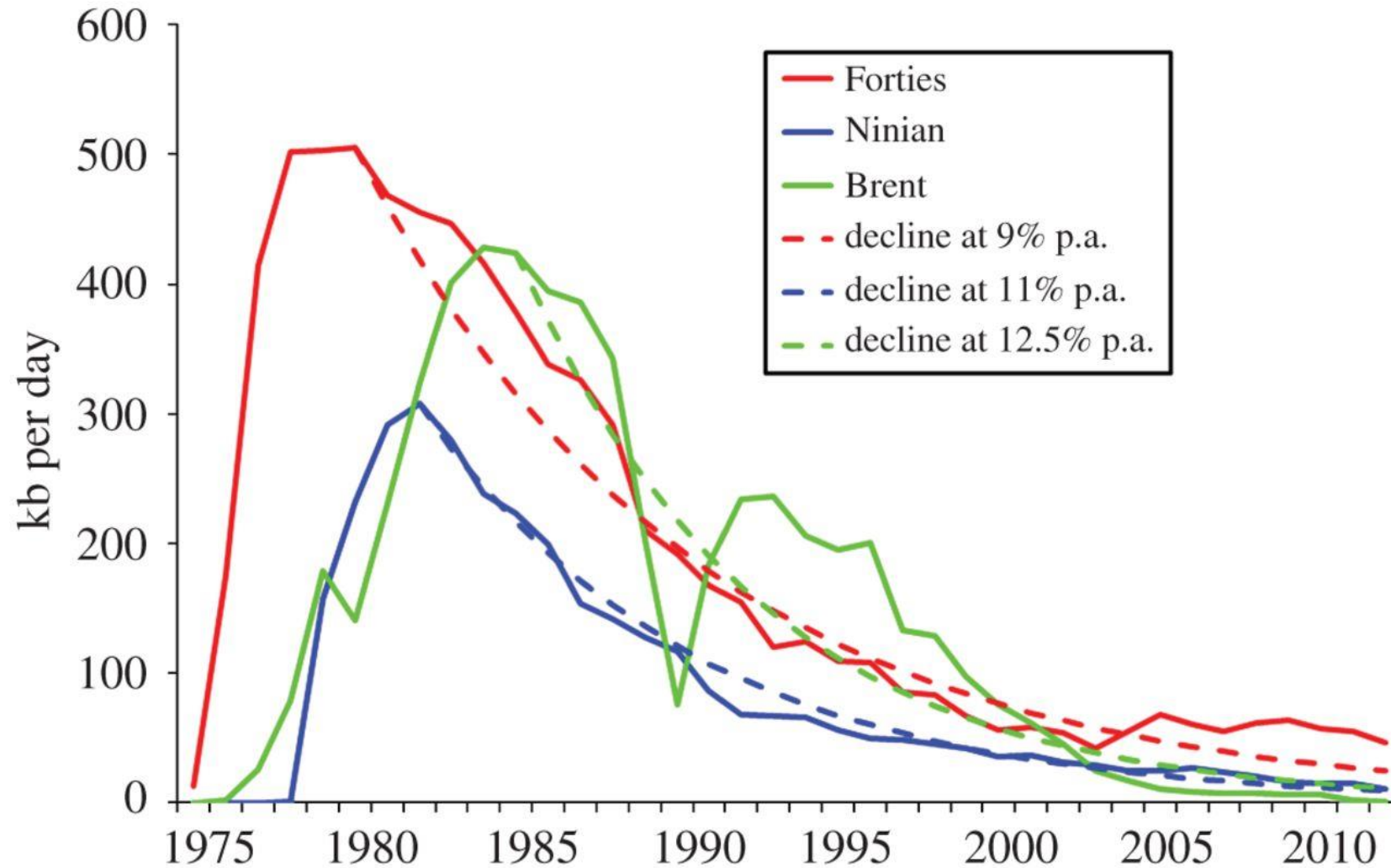
- You can't predict the spatial distribution of open fractures in the subsurface based on a few cores, image logs, seismic etc.
- Flow patterns can be very complex and difficult to predict; in-flow to a few wells doesn't change this.
- Simulation of dual-porosity (matrix + fractures) systems is very difficult and tends to be run on coarse grids, reducing predictive power.
- Analogues are of limited use: maybe best avoided?

All very different to normal sandstone reservoirs.....

Consequences!

- As many executives, investors and analysts have learned, it is excessively optimistic to predict the likely reserves in fractured carbonate reservoirs after a short appraisal program.
- Or on the basis of analogues.
- Our predecessors learned that the way to approach such fields was to develop them progressively, learning as they went.
- Kirkuk and Ghawar exemplify this approach....
- Whereas the North Sea doesn't have to.....

North Sea Fields, typical sandstone reservoirs



Kirkuk Field production history

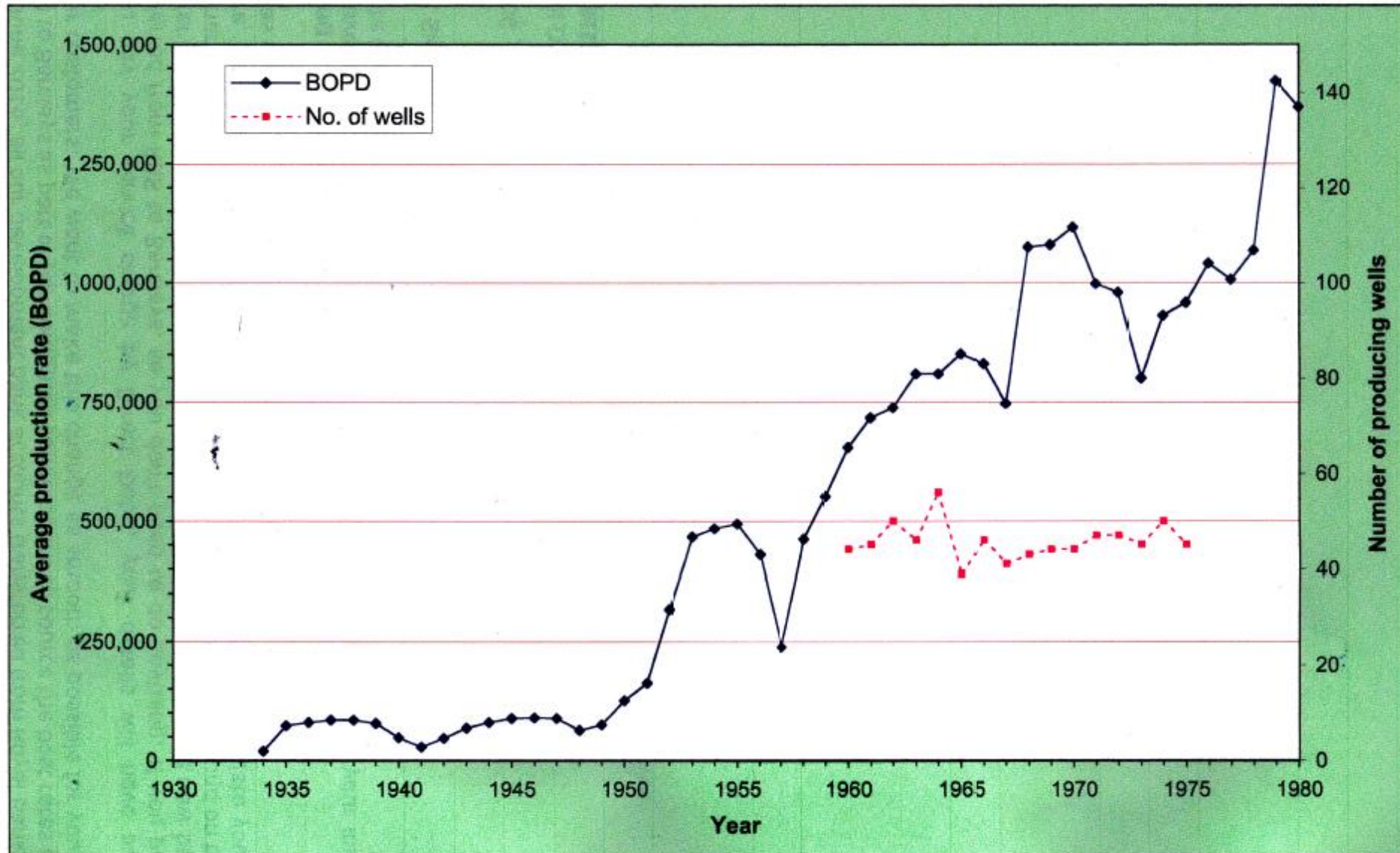
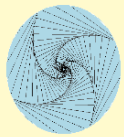


Figure 3 - Production history of the Kirkuk field reflecting the well connected nature of this karstified reservoir. The end members of conventional matrix porosity and cavern porosity are interlinked by a pervasive fracture system.



The Energy Consulting Group

Estimated Ghawar Average Daily Production by Year

