



Exploration to 2050

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It seems to me that there are two major themes that will define Exploration to 2050:

Firstly, opportunity – exploration will happen where the industry sees opportunity – controlled by the usual mix of new resource, new technology and changing geopolitics – but also increasingly influenced by the new and growing power of public opinion.

Secondly, capability – the availability of human capability to deal with the complex, integrated world of an increasingly sophisticated science and industry doing ever more complex things.

I will elaborate briefly on both.

The major new resource opportunity of the past two decades has been deepwater oil and gas. Petrobras opened this in the 80's with the Albacora and Marlim discoveries, followed some years later by the Gulf of Mexico, Angola and the rest of the world.

Over the past 20 years that success has contributed about 30% by volume to global oil and gas discoveries. Today the deepwater finding curve continues to rise steeply and shows little sign of a plateau.

However, the intensity of deepwater exploration has grown hugely. Licence rounds, such as the recent ANP 11 in Brazil's north eastern margin are hotly competed and large positions are being taken by a wide range of companies.

In many ways deepwater has become conventional with a very low entry barrier. There are over 140 ultra deepwater rigs available today, compared with only 40, 5 years ago . And the risks highlighted by the DWH event have not deterred new entrants; nor caused Governments to restrict participants.

However, over the next 40 years the success in deepwater is unlikely to continue due to the increasing maturity of deepwater exploration. And I am not saying we still won't find new large fields – just that new provinces are increasingly unlikely and volume delivery will inevitably drop off.

And so the industry will need to look for new frontiers. But where?

To me this means two very different geographies.

Firstly, the Arctic offshore. The continental margin of the Arctic Ocean is little known and largely unexplored. It has huge potential, but much of it will be prohibitively expensive to drill and even then is beyond the reach of present engineering capability to produce.

Notwithstanding this, exploration activity in the Arctic has increased over the last decade and looks like taking off in the remainder of this decade, especially in Russia.

Secondly I think we will go back to the onshore, and back to places “where man has gone before”, but with new ideas and new technology. This trend has started in the US with the Tight oil and Shale gas developments, but it has a long way to go both there and globally.



Key to this will be doing something that has not been done before.

For example, a map of East Texas showing wells drilled, is just a mass of black, with over 100,000 wells on it. But a map of East Texas with only those wells deeper than 4000 metres shows a lightly explored terrain, with relatively few wells testing the deeper plays down to the source rock. The same point is true of 3D seismic coverage which is only about 20% of the same prolific area.

And there are parts of the world just not explored. The cratonic basin of the Congo is about four times the area of East Texas, and has a grand total of four exploration wells and a few 2D seismic profiles that address a basin over 1.2 million square kilometres in area.

Of course hydraulic fracturing technology and steam assisted heating will also be at the vanguard of this onshore focus. One, changing permeability, and the other viscosity. We will also find other methods to change these two fundamental parameters such as microbial and electric processes.

The direction of political change is less clear. But the changes of the last 40 years have been profound and there is no reason to believe that rate and scale of political change will diminish in the next 40 years, perhaps the opposite. Iran withdrawing from the international community and Russia opening up to it; are but two big examples of change from the past 40 years.

My last point regarding opportunity is about the increasing power of public opinion. The growth of social media over the past five years has elevated the voice of the individual to global status – irrespective of the validity or sense of the stand or point being made. The power to lead opinion and even action has now fallen to the fastest tweeter.

This has contributed to the fall of governments in North Africa and has impacted the reputational standing of companies and individuals. It has yet to bring a management team or company down. However, as new opportunities are considered and pursued it is clear that increasing engagement and transparency will be required by the oil and gas industry to assure a concerned public that it understands the risks it is taking and is able to deal with them.

The other major trend I'd like to mention is about capability. Not the demographic issue of the crew change of today, but a much deeper issue about the nature of the capability of the people we have and the skills and training they will need in the future.

The dilemma here is that our educational system tends to focus on developing deep specialisations. Yet as our industry gets ever more sophisticated and complex it requires a broad knowledge of many disciplines to understand the whole and be able to lead it.

We will need to solve this dilemma. We will need people able to deal with large volumes of data comfortably; able to integrate diverse subjects and contrasting views; and perhaps most of all able to communicate at a level that non-specialists, the general public and even politicians can understand.

Because, as the frontiers change, we need to be able to explain the opportunities that change brings and gain people's trust that we understand and can manage the risks – that is a massive task.