oil companies, with the profits from higher oil prices, to have focused on more exploration any time in the past few years. Instead, a jaundiced seismic sector has sensed that impressing the stock market through asset deals to increase reserves, streamlining their businesses, and buying back their own shares, have been the priority for oil companies.

Particularly during the last couple of years when it defied logic for oil companies to hold back on exploring for new reserves, seismic companies have just had to keep telling themselves it had to happen sometime, if only because there is a limit to how much can be squeezed out of existing assets. Indeed, realizing that they were fighting a losing battle with regard to pure exploration spending, geophysical contractors have been concentrating on developing technology such as 4D seismic to show that their expertise can be used to optimize reserves recovery from existing and future oil and gas developments. Reservoir seismic has as a result come on in leaps and bounds, but it is still not mainstream.

PGS in a recent investor presentation showed a calculation by Enskilda Securities which demonstrated that there was a 49% mismatch in the historic correlation between exploration and development. It concluded that the 'under-investment' in exploration was evident from the low levels of drillable prospects available, failure by oil companies to reach production growth targets, and a declining reserve/ production ratio. Enskilda forecast that exploration activity would continue to rise to address these issues, which is what appears to be happening.

and Multiwave Geophysical also have some 3D capacity, and that's about it. According to an internal PGS marketing analysis last year, PGS and WesternGeco between them were responsible for over 60% of the total contract and multi-client 3D seismic acreage shot in the 12 months of the study (split more or less 50:50). CGG and Veritas each shot around 10% with Fugro and others making up the balance.

A sustainable recovery implies more than strong demand. It is nice to have clients queuing up for vessels, but contractors still have to improve margins and not chase the market down. Last August, CGG raised some eyebrows by sealing a contract with ONGC of India to carry out 19 separate surveys over $13,000km^2$, mainly in the Bombay High Basin, with a bid of $103 million, understood to have been well below the competition.

The grumblings may have just been sour grapes, but the fear of market discipline breaking down is clearly real.

Word from TGS-Nopec in its financial reporting last month was encouraging on the pricing score. The company suggested that vessel contract rates in general have already increased 10-20% from the 'trough' levels of 2002 and 2003. TGSNopec is worth heeding. It was the smart company which escaped the maladies affecting most of the marine contracting companies with its business model of leasing vessels on short-term charters and not owning them, and by focusing exclusively on well-supported multi-client surveys.

Even in this more buoyant market, the challenge for the marine seismic business is to extract full value to reflect its capital investment, technology and expertise. The lurking danger is the 'commodity' word. Following the market slump of the late 1990s, when contractors would buy jobs in order to keep their vessels working rather than laid up, it was easy for oil company clients to get the idea that 3D surveys were much the same whoever did them, it was just a matter of picking the cheapest. It is said that plenty of national oil companies still think this way, especially as many want to keep costs to the minimum and may lack the in-house expertise to be more discriminating.

WesternGeco, under the guidance of Schlumberger, has to be respected for the way that it has spent an inordinate amount of money and research resources on technology to differentiate itself from its competitors. Last October the company added the *Western Regent* as the fifth vessel in its growing fleet of QMarine seismic vessels for which it is able to charge a premium price. No one seriously doubts that Q-Technology, claimed to be the only fully calibrated, point-receiver marine seismic acquisition and processing system, has the potential to produce excellent image quality and repeatability. This makes it especially attractive to companies carrying out 4D seismic survey work using towed streamers. Last autumn, Petrobras selected WesternGeco to carry out the world's largest 4D seismic project to date over the Marlim complex, offshore Brazil. The five month survey was to be carried out by the *Western Pride* towing 10 cables each 6000 m long with 50m streamer separation.

WesternGeco's revenue from all QTechnology applications (including land) grew from $79 million in 2003 to $162 million in 2004 with similar growth predicted for this year, according to Schlumberger's most recent financial reporting on the company. Interestingly multi-client sales (mainly in the Gulf of Mexico) also contributed substantially to WesternGeco's return to profitability in 2004 with a pretax operating income of $124 million compared with a loss of $20 million in 2003.

The over-investment in multi-client marine seismic to keep boats busy, and the wildly optimistic accounting of the value of multi-client libraries, were a contributing cause to the problems felt by most of the marine contractors a few years ago. Yet, there was never anything fundamentally wrong with the multiclient idea, especially in the Gulf of Mexico where the licence areas are too small for the commissioning of proprietary surveys. Aggressive marketing of multi-client libraries and some new surveys can be expected from all the main contractors. PGS, Veritas and CGG all have significant multi-client data and can be expected to be on the look-out for suitable opportunities to add to their libraries, more often than not with special processing packages to bump up the value.

Always up with the game, TGS-Nopec Geophysical, which deals only in multiclient surveys, last year added NuTec Energy, a Houston processing house, to its armoury. Hank Hamilton, CEO of TGS-Nopec, said at the time of the acquisition that NuTec's tools would enable the company to provide custom 'add-on' depth imaging solutions for existing data licensing customers.

More or less unannounced, PGS has vessels to a form of solid streamer. This is differentiation of a sort, in that solid streamers are said to provide a more stable setstreamer separation used in HD3D can achieve much the same result as Q-Marine in terms of high quality imaging. Andrew Long, technology manager, PGS Geophysical, says 'more and more surveys will be customized at the acquisition stage to provide the best platform for specific processing technologies. That has been a major push for us in driving the HD3D market, in other words a better platform for processing in a very cost-effective and robust manner.' Long adds that better spatial sampling on its own is not necessarily enough. PGS has been working with multi-azimuth streamer surveys with more than one shooting direction to improve illumination, for example below complex salt bodies in the Gulf of Mexico.

Veritas is taking much the same approach as PGS in its belief that a package of acquisition and distinctive processing can separate it from the pack. The company has also built up something of a reputation for sub basalt imaging using long offset techniques, for example in the northeast Atlantic margin. Where the company has stolen a march on all its competitors has been in its involvement with the UK government's Promote licence round designed to encourage new players into the UK offshore exploration activity who can work up prospects without all the commitments of a full licence. Veritas advised the UK Department of Trade & Industry on the setting up of the licences and currently has 100% interests in 11 of the 21st and 22nd Round Promote licences covering 12 blocks in the UK central North Sea. In the last few months it has come to agreements with Kerr-McGee North Sea and Maersk Oil (UK) on farm-ins for two different blocks in the central North Sea on the basis of work carried out by Veritas.