## **Deep Imaging Find New Plays**

North Sea Renaissance (NSR) is an ongoing long offset 2D seismic program that will total some 85,000 km at the end of this year. The program is acquired with a cable length of 8,000 m, while data processing is optimised for the purpose of deep imaging and AVO capabilities.

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There was little industry interest in 2002 and 2003 when TGS launched the idea of aquiring a new generation of regional, long offset, long recording 2D data covering the entire North Sea Basin. The reaction was that there was no need for new 2D in this mature basin, where the market had been dominated by 3D for almost two decades.

However, in TGS we decided to take advantage of recent advances in streamer technology, data processing, storage capacity and AVO. Our first aim was to produce a consistent dataset for the unexplored Paleozoic section, but we also wanted to present the pre-stack data in a user-friendly, easily accessible format, in order to facilitate quantitative AVO interpretation of the Tertiary and Mesozoic section.

Despite having no industry support, TGS started the North Sea Reconaissance pilot program in 2003. With an 8,000m streamer and 9



From a modest start in 2003, acquiring some 3000 km of 9 seconds data, the NSR regional 2D program will reach 85,000 km this year, thereby extensively covering both the main fairways in the UK and Norwegian and flanking unexplored parts of the North Sea.



 $\mathsf{PRIMA}^{\mathsf{M}}$  is a powerful processing software enabling users to perform AVO analyses in parallel with interpretation. The entire NSR gather database is available in one project together with the stacked sections and the velocity database.

seconds recording, this survey, known as NSR03, revealed deep strata previously never seen, and the long offset pre-stack gathers demonstrated its AVO potential. Every year since then TGS has had several vessels working on the NSR program, and by the end of the 2007 season the program will have reached approximately 85,000 km.

As the governments in both Norway and the UK have encouraged new exploration in recent years, additional acreage has been opened for exploration, and more oil companies than ever now participate in the search for oil in both mature and less mature parts of the North Sea. The NSR grid is ideal for this purpose, as its deep imaging reveals unexplored Paleozoic plays and also allows the interpreters to analyze the rock properties and fluid fill of potential traps.

More than 50 oil companies have licensed parts of the NRS grid since the program started. As much of this has been acquired over open acreage, the data is now being used both in evaluation prior to licensing and in preparing work programs over awarded blocks, as much of these areas are too large and immature for 3D.

A wide variety of both pre- and post-stack deliverables are available to the user. The majority of clients ordered pre-stack gathers, but TGS discovered that few of them were using this data. This appears to result from a lack of suitable tools and skills for evaluating the pre stack gathers, together with the time consuming process of data management related to several TerraBytes of data. TGS took note of this and initiated a project to make all the pre- and post- stack data available online, including a license to PRIMA<sup>TM</sup> AVO processing and interpretation software. This means that clients are ready to work within a couple of days.