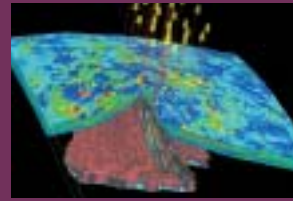


# Outsourcing in-house



By Guillaume Cambois and Bruno Bleines

Dedicated processing centers are fast becoming a CGG specialty as a growing number of our clients elect to outsource their data processing requirements in-house. With a 75% share of the market, CGG remains undisputed leader in this business.



## Flexible formula for scalable solutions

*Because seismic data processing is not part of their core business, most oil companies outsource this activity. Yet seismic data now play an ever-increasing role in the life of oil and gas fields. From reconnaissance exploration to prospect generation, field appraisal and reservoir management, seismic data provide key information. It is therefore critical that data processing projects be fully integrated within exploration and production teams. This is why CGG offers dedicated services on client premises, to provide the full range of seismic processing. Main advantages are reduced turnaround, improved quality and lower global cost. Beyond this, a long-term relationship develops, built on trust and technology partnership.*

Dedicated centers can be of any size and focus on any scope of work. At one end of the scale, CGG operates a one-man outfit for OMV in Vienna and, at the other, a full-blown land processing center for PDO in Muscat. CGG provides reservoir management for PDVSA in Maracaibo, prospect generation for PEMEX in Villahermosa, 4D processing for Shell and BP in Aberdeen and Stavanger, depth imaging for NAM in Assen, and acquisition design for TotalFinaElf in Pau. These are but a few examples of the wide diversity behind the term "dedicated center."

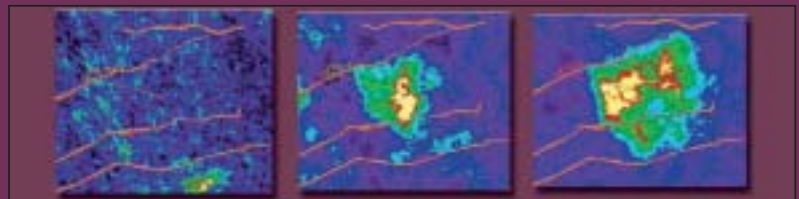
Bertrand Chavane, the first CGG center manager in PDO in 1994, recalls: "We had to mobilize 60 geophysicists and use a mainframe computer that we had never tried before. It was an exciting project, bringing together a team of staff from 17 different countries. All were experienced staff from CGG's existing network of centers. I remember we started production on the very first day of the contract."

Dedicated centers are usually set up for a given amount of work. When the forecast volume exceeds the contractual throughput, the client can either decide to outsource the work, or add resources to the dedicated center at relatively short notice. If and when the volume of work decreases, CGG takes responsibility for redeploying staff. In fact, our contractual obligations are tailor-made to suit specific client requirements.

1993 survey pre-injection

1998 survey

1999 survey



*Courtesy of BP, time-lapse survey to monitor the gas disposal well in West of Shetlands.*



BP client, Einar Kjos and CGG in-house geophysicist, Sebastien Soulas discuss the results of re-processing trials for pending licence round applications.

According to Einar Kjos: "For the 17th round, it has been very beneficial to have 2D processed on site... The resulting efficiency is a competitive advantage."



CGG's dedicated reservoir team in Maracaibo celebrating its fifth anniversary of collaboration with PDVSA in December 2001.

**TAILORED SOLUTIONS** IT expertise into the bargain

Beyond the geophysical scope of work, there are also IT issues to consider. Geocluster™, CGG's processing package, runs on Unix and Linux and has been optimized for most computer mainframes (SGI, IBM, SUN, PC cluster). Various scenarios are possible for computing power. CGG can run its software on the client's computer, or integrate its own computers within the client's network, or even provide outside computer capacity from one of its regional "hubs." Some dedicated centers have chosen a combination of these solutions.

CGG's expertise in the design, implementation and support of IT systems is also a capability clients like to utilize in their dedicated centers. "Because of our pioneering work in IT, most recently with PC clusters, many clients have also asked us to help them develop IT solutions," explains Andy Crisp, CGG manager of IT Services. "In fact we often extend our services well beyond the scope of a dedicated center, offering support to the client's wider IT infrastructure."



The IT services team in Nigeria: A. Omoni, G. Mansfield, A. Adeyemo, F. Isibor and G. Odelana.

**ENHANCED ADDED VALUE** Faster turnaround and improved quality

Having access to an in-house center cuts down tremendously on project turnaround time. There is no need to go through the tendering process nor reinvent project management procedures and communication channels. Resources are readily available and dedicated to projects. QC and testing strategies are well established, decisions are made on time and specific final products are produced routinely.

But beyond the turnaround of the processing project, what matters most is the cycle time of the overall exploration or production project. "It is not so much the turnaround time that is of concern," says Ernst Stroebel of OMV, "it is the fact that interpretation is already underway at an early stage of processing. A dedicated center provides optimum interaction between seismic interpreters and processing geophysicists."

By having a processing team fully integrated in the E&P center, the cycle time is dramatically reduced. Processing geophysicists understand client expectations and are aware of project goals; interpreters realize what processing can achieve and know the right tools will be used to meet their goals.

This is especially true for 4D, where tailored processing sequences are implemented to achieve reservoir monitoring targets in the fastest possible time. Dave Tam, CGG center manager in BP Aberdeen, agrees: "We have been given extremely ambitious turnaround targets for marine 3D, 4D and prestack depth migration projects. We have worked with the client to streamline the workflows and ensure we meet the demanding deadlines. It has been a productive collaboration, of benefit to both CGG and BP. Now I expect the goalposts to move again!"

Yet reducing turnaround should never be at the expense of quality. The cornerstone of a successful dedicated center is trust. CGG project leaders adapt to the client-specific Quality Management System and strive to guarantee total Quality Assurance – some dedicated centers are certified to ISO9000 standards. The goal is to establish a relationship built on trust, which will ultimately cut down on supervision cost. Indeed, in some centers, the dedicated teams have been used to QC the overflow work outsourced to other contractors.

In turn, the client gains more confidence in the delivered products. This is fundamental, given the impact these products have on drilling decisions. Trust is key to the success of a dedicated center, and CGG is proud to have achieved this with all its clients.



Salim Al Ameri, a CGG hardware engineer preparing the PC cluster for shared Sipmap/Geocluster™ usage at PDO.



David Dickinson, team leader at BP Aberdeen.



Dave Tam, CGG center manager in BP Aberdeen.

**INNOVATIVE EDGE** Partners in technology

CGG's industry-leading technology in 4D, 4C, advanced time and depth imaging, and prestack inversion is equally accessible from open or dedicated centers. However, an in-house center is more conducive to technology partnership, allowing CGG to gain a better understanding of the challenges facing clients. From any given center, the client can draw on CGG's worldwide "knowledge base." If a specific technology needs developing to solve a given problem, CGG will assign its resources to it. In the words of Arturo Perez Aldana, head of PEMEX-CNPS (see insert), "instead of being a straight provider, CGG is seen as a technology partner."

Some clients have even opted for in-house R&D teams. These teams develop Geocluster™ modules that are immediately made available to sister centers dedicated to other asset groups. Arne Saetrang, CGG center manager in BP Stavanger, comments: "The Aberdeen R&D team develop and test their new modules, but we are right behind them when it comes to applying the technology to our 4D projects. I believe these software exchanges between the two CGG dedicated centers are an important communication vector between BP's two major North Sea asset teams."

There is always a formal understanding over the ownership of the technology partnership: either total client ownership or an in-house exclusivity period. Some clients, who prefer their technology to

remain wholly proprietary, ask CGG to "sandwich" some of their own applications within Geocluster™. This allows their various asset groups to apply proprietary steps within the standard processing sequence. Cemal Dervish-Uman, center manager at SPDC in Port Harcourt, agrees: "Because CGG's software is so flexible, data can be seamlessly exchanged between Geocluster™ and Sipmap (Shell's proprietary processing package). This means that any new client technology can be readily implemented within a production environment in such a remote location as out here in Nigeria."



Marianne Rauch shows a potential prospect to Carlos Barajas of PEMEX-CNPS.

**SKILLED PROBLEM SOLVERS** People with a passion

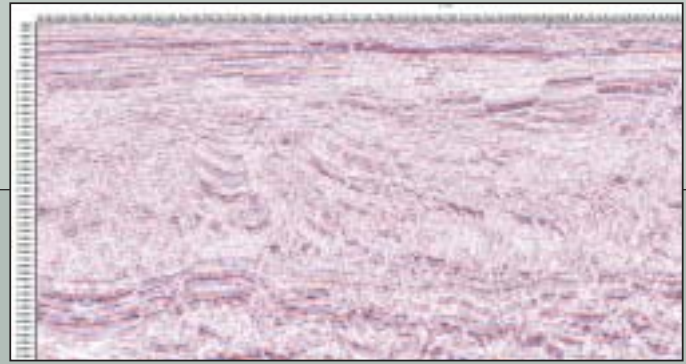
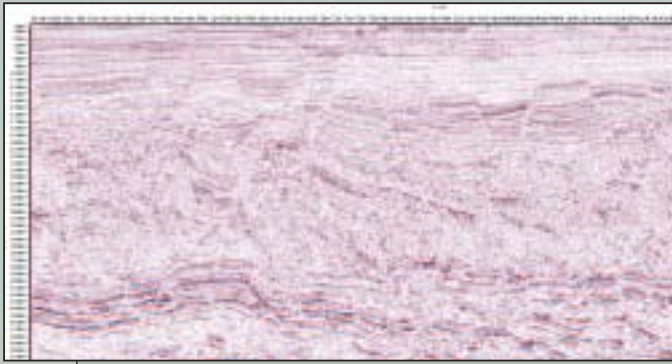
The most advanced technology is useless without the people to apply it. Tom van Dijk of NAM, agrees: "Despite all the advanced technical software and case study demonstrations on actual data, in the end what counts is what the in-house people can contribute to resolve NAM's geophysical problems."

Over the years, CGG has developed a unique "problem-solving" culture, which has always been valued by its clients. There is no better place than a dedicated center to take full advantage of these skills. If the problem cannot be solved locally, the entire network of CGG centers can be called upon to provide a solution.

Beyond their technical expertise, CGG staff bring along project management skills and total flexibility to adapt to any working environment. Carlos Barajas, Head of special processing projects at PEMEX-CNPS, confirms: "CGG differentiates by the technical knowledge of its staff as well as their capacity to adapt to business demands and the cultural environment. For example, we can see that Marianne Rauch, the local CGG manager and an AVO expert (a native Austrian), is making great efforts to speak Spanish to communicate better with our PEMEX people."

Clients have many words to describe CGG personnel: "skilled problem solvers," "persistent and enthusiastic," "open-minded," "passionate," "hard working." But they can all be summed up in one word: DEDICATED!





Courtesy of PEMEX, 3D offshore survey original (left) versus CNPS 2002 reprocessing (right) including High-Resolution Radon demultiple (RAMUR) and A+ (anisotropic) Kirchhoff prestack migration (TIKIM).



Arturo Perez Aldana, Managing Director of CNPS.

An interview with Arturo Perez Aldana, Managing Director of CNPS (National Seismic Processing Center of PEMEX).

*What is the extent of your collaboration with CGG?*

We tendered our first dedicated center in 1998 which CGG won: at that time it was a necessity for PEMEX to give us more flexibility and reactivity.

We anticipated some difficulties at the outset regarding the way in which we would work with our asset teams. CGG overcame these much faster than anticipated.

The success of that first center was due to the insight CGG gained into the concerns and objectives of our asset teams. Since then, CGG has extended its dedicated services to include a Reservoir Geophysics team, whose role is to generate drilling prospects, and a Data Management team.

*What is the impact for PEMEX?*

In the beginning, the interpreters were not convinced about this type of service. Both we and CGG convinced them that good quality results could be produced rapidly for better drilling locations. Now, they know us and believe in our results. They want to back all drilling location requests with our AVO-Inversion results.

We have noticed a reduction in turnaround when processing in the dedicated center. Indeed, we have been able to process more in the same timeframe. The benefits are a shortened turnaround, which is the most important point for our clients since it adds more value, and a reduced processing cost.

CGG is unique in providing us a continuous technology transfer program. In terms of processing techniques, we have had a boost in quality and productivity with some new modules: anti-noise (TDNFK, RAMUR), interactive velocity analysis, GEOVEL, and CGG Kirchhoff PSTM tools and velocity picking methodology.

*How do you split the work between the dedicated center and outside contractors?*

When our clients (i.e. PEMEX asset teams) request some work requiring special attention, we have found it better to give it to the CGG team working with Geocluster™ inside our center than to

farm it out to a contractor. A case in point occurred recently when an Asset Team gave us a land 3D to reprocess to improve the structure (see figures below). Although the original processing was recent and of good quality, our geophysicist with the help of CGG's technical team made a critical improvement to the full satisfaction of our client.

Geocluster™ techniques such as noise attenuation and 3D Kirchhoff PSTM took most of the credit.

Courtesy of PEMEX, imaging enhancement of a 3D land survey, original (above) versus CNPS 2001 reprocessing (below).

