

# Quality control is challenging but achievable

E&P activities continue worldwide despite increased risks. Improved processes and tools make niche capabilities such as seismic acquisition quality control more achievable than ever and help raise awareness of risk factors.

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Until now, seismic data acquisition quality control (QC) has rarely been done at the right time by the right people with the right processes. Yet every day dynamic geopolitical events change not only the financial values but the risks involved in oil and gas E&P. Financial markets that fall and rise dramatically give companies second and even third development pauses. Stunning upsets shut down opportunities to explore and produce.

The truism that “all the easy oil’s been found” is true. E&P increasingly must be undertaken in more extreme environments. Still, the number of seismic surveys, with their crews and equipment, lines and channels, is moving upward again and fast. What are the circumstances that drive the need for better, sharper QC?

Field work and management constitute one set of issues. Crews are working more remotely in rain forests and jungles, mountains and desert regions, arctic terrains, off continental coasts, and in deeper water. Such efforts demand more management.

Oil and gas companies increasingly must manage more projects from supervisors’ desktops using rapidly multiplying online capabilities and remote-access databases. In case after case, applications drive practice, including the marine and land project monitoring tools that drive decision-making closer to real time.

## Changing art to science

The “art” of seismic acquisition QC in the industry has been bird-dogging. Less-than-rigorous QC efforts have suffered from the lack of uniform consultants’ procedures. QC has been practiced casually; there has been no process, and this lack of formality has increased the failure rates of the collection process itself. Consequently, the same problems have kept companies from getting total and efficient QC of seismic data acquisition.

QC consultants’ varying levels of experience frustrate efficient QC management as well. Process, rigorously applied by professionals, is what has made QC become

a science today. In the hands of modern practitioners, the purpose of the modern QC process is to determine and then verify whether the field process of acquiring and transmitting seismic data meets or exceeds the expectations of the customers. The task of a modern QC company is to maintain standards and report that the standards have been met.



**A crew lays out receivers for transition zone operations offshore Qatar. (Photos courtesy of Jaguar Exploration Inc.)**

This involves a disciplined, organized collection of procedures that can make effectiveness simpler to achieve.

One example of such challenges is field labor. Old-fashioned QC contractors have not invested in field workers’ disciplined training. That has led to ineffective field practices and very poor report-writing procedures. Another is a lack of dedicated comprehensive QC management software. Customized seismic data management packages are rare (or nonexistent), even at the oil company level.

Today’s seismic data collection quality challenges need to be met with by-the-numbers professionalism

supported by software applications that are readily accessible from anywhere in the world.

### Repeatable QC processes

Whether seismic acquisition crews are ankle-deep in sand in Qatar's Dukhan field or up to their waists in water in the Marañon basin in Peru, modern QC personnel need to apply detailed procedures that cover seismic acquisition techniques and data, crew efficiency information, and HSE data in a disciplined manner such that:

- Regularized, repeatable procedures can overcome the previous dissimilar project practices that resulted in unreliable data;
- A consistent level of QC personnel training conquers poor field practices and improves report generation; and
- Detailed procedures help generate higher quality reports leading to more effective risk management in the field and in the office.

Effective QC activity relies on the onsite presence of QC professionals. It assures that there is an independent check on daily and weekly activities, no matter how distant the home office is from the project site. These "field QCs" now use their advanced processes for both contractors and oil companies to achieve the levels of quality and control that are increasingly in demand.

### Web-enabled applications

The Internet is another driver in effective QC. A software program created by Jaguar Exploration now gives the industry stringent and effective QC for seismic data acquisition and its collection processes online for the first time.

JagSeis Seismic Acquisition Management & Quality Control provides a complete suite of interactive modules, including the ability to send, receive, and archive critical QC data safely and securely via the Internet.

The system provides field QCs and field supervisors with the ability to maintain and view production statistics every day throughout the life of the project.

The application also enables the deployment of uniform procedures for QCs to effectively and consistently perform their activities by collecting, analyzing, and monitoring all phases of a seismic survey. It covers HSE, geodetic QC, acquisition QC, processing QC, and costs (information available only to clients).

In HSE, for example, the system provides an automated accident prevention-focused methodology for supervising



**LEFT: Field workers move equipment along a recording line in a jungle in Peru.**  
**ABOVE: HSE compliance can be tracked with a handheld GPS unit.**



project safety, environment, and health issues. It provides dynamic, real-time tracking for improved risk control. A client dashboard displays easy-to-read visual indicators for continuous auditing of HSE issues on site. Seismic clients get the desk-accessible tool they need to review real-time data and key performance indicators for better daily decisions.

The software includes a professional-level replacement for the "traditional" QC spreadsheets to reduce field errors. The software also features built-in tools to check vibrators and instrument test results in the field as well as integrated ArcGIS software for mapping capabilities.

Fast error detection of seismic contractor reports is uploaded to the system from the field, and data from any other contractors involved in the seismic survey can be stored securely.

### Field experience, technology

Experience demonstrates that seismic data acquisition QC and auditing programs improve results in the field and in the office. Reliable web-enabled technology increasingly supports this, especially since real-time control of geophysical, positioning, and acquisition disciplines is in high demand.

Based on that same experience, a disciplined process of QC proves to be the first step in reducing the risks involved with using contractors without formal knowledge systems.

It also is the real key to more effective risk-sensitive management of a complete seismic project. **ESP**