



Geo Resources Consultancy International

ENVIRONMENTAL & EARTH SCIENCE CONSULTANTS

الموارد للإستشارات الجيولوجية العالمية

مستشارون في علوم الأرض والبيئة

1999



Geo Resources Consultancy International (UK) Ltd

Founded in 1999, Geo Resources is an international oil and gas consultancy covering earth sciences and environmental services, demonstrating a proven track record in field and sub-surface technical excellence with the highest level of safety.



**Geo Resources
Consultancy Int'l**

ENVIRONMENTAL & EARTH
SCIENCE CONSULTANTS

الموارد للاستشارات الجيولوجية العالمية
مستشارون في علوم الأرض والبيئة



OUR ETHOS IS BASED AROUND
FOUR CORE PRINCIPLES:
**SAFETY, EXPERTISE, ACCURACY,
AND NEW TECHNOLOGY.**

Geo Resources has grown rapidly to become a global leader in exploration services to the oil and gas industry, developing proprietary on-line geophysical training platforms for our clients, along with remote QC software which is capable of analysing the technical integrity of all seismic instrumentation and sources.

Use of the latest technologies, techniques and software ensures optimal accuracy and reliability providing solutions for challenging projects, however remote, anywhere in the world.

We believe that in our industry high operational standards are essential, not only for the longevity and reputation of our business, but for the environments in which we work and for the consistent delivery of cost-efficient services. Delivering the best possible outcome to our clients is paramount, whatever the problems faced.

We also attach special importance to direct cooperation and effective communication with each client in order to ensure the clearest understanding of every stage of the service provided.



OUR GEOPHYSICAL TEAM UNDERSTANDS THE REQUIREMENT TO DELIVER SAFE, EFFICIENT AND HIGH-QUALITY RESULTS IN ANY OPERATING ENVIRONMENT.

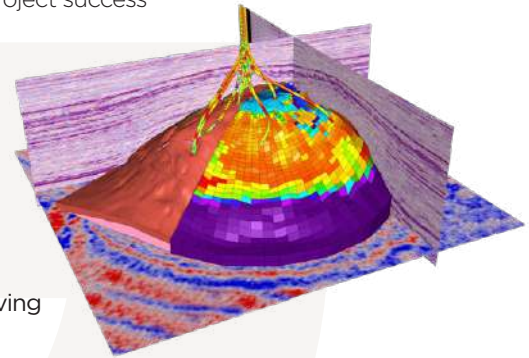
We employ the industry's most talented, highly skilled and versatile specialists to oversee any project to bring detailed solutions, guaranteeing the delivery of the best possible data.

With a number of projects successfully completed, we have a reliable and recognised record of delivering results and offering solutions in every environment, adding value and reducing risk to ensure project success from every aspect.

Our service offerings include:

- ✦ **Geophysical Technical QC**
- ✦ **HSSE QC**
- ✦ **GRC SeisTrain™** on-line Geophysical Training Platform
- ✦ **GRCSeisQC™** Remote Land Quality Control Services
- ✦ **GRCSafeInsp™** HSE Inspection App™ for Geophysical HSE Inspections
- ✦ **GRCSeisTrain DDT™** Remote Off-Road Defensive Driving
- ✦ **GRCSurvQC™**
- ✦ **GRCVehicleInsp™** Vehicle Inspection Service
- ✦ **GRCProjectScout™** Seismic Project Advance Scouting Service
- ✦ **GRCTechInsp™** Seismic Crew Technical Inspection Service
- ✦ **GRCProMount™** Mountaineering and Steep Terrain Specialists
- ✦ **GRCTechAudit™** Land Seismic Technical Auditing
- ✦ **GRCProjManagement™** Project Management Service

These tools ensure that any seismic survey is produced accurately, on budget and on time. The full suite of our geophysical services is outlined on the following pages.





GRC GEOPHYSICAL QC SUPPORT SERVICES (LAND & MARINE)

Seismic exploration is the single and most important geophysical technology in the exploration for energy resources. A successful seismic survey is dependent on the overall quality of the acquired seismic data, and our highly professional project managers and technical client representatives are committed to achieving the best possible results. We work closely with the client and contractors to achieve operational excellence with full adherence to HSSE in every aspect, from project inception to completion and beyond.

All Geo Resources Consultancy International specialist consultants follow a strict code of professional conduct, exhibiting and upholding professional and personal integrity at all times, ensuring compliance with all relevant legislation and regulations in all countries where we operate.

GRC HSSE QC SUPPORT SERVICES (LAND & MARINE)

Geo Resources Consultancy International provides Health, Safety, Security and Environmental QC Specialists for Land, Marine and Transition Zone projects, with worldwide experience and a proven track record in any environment. All of our specialists are highly qualified to internationally recognised standards, with a minimum of 15 years' experience within the industry to meet the client's health, safety and environmental objectives which are critical to project success.

In addition to Health, Safety and Environmental, our specialists will advise on local security and propose management guidelines as appropriate to our clients.

HSE awareness and training is at the forefront of Geo Resources Consultancy International's vision, and our specialists are NEBOSH qualified, and will provide training courses to the contractor's own personnel as part of their project assignment, if required.



GRCSEISTRAIN™ GEOPHYSICAL TRAINING & DEVELOPMENT PLATFORM

The SeisTrain™ course is designed to train personnel in the methods, skills and attributes required for the competent quality control of the data acquisition of a seismic exploration project, operating on either land or marine using multiple acquisition techniques. It also covers the basics of HSE Management systems specific to seismic operations which often take place in remote environments.

Technically the course covers all aspects of seismic acquisition so that trainees understand the full acquisition process from survey positioning through to in-field data processing using the latest acquisition technology, to include Drones and Nodal sensors. Training is 'hands on' and requires that trainees be fully committed to both theory and practical tasks.

The training program, being modular and flexible in nature, allows for progressive development as operational conditions permit and can be tailored to meet the needs of the client. The training can be utilised for Land, TZ and Marine seismic projects with a focus on the very latest technology.

GRCSEISQC™ REMOTE LAND QUALITY CONTROL SERVICES

The GRCSeisQC™ program enables the remote quality control of 2D/3D Vibroseis acquisition data via internet from anywhere in the world. Our proprietary software provides detailed analysis of the acquisition system components and vibrator performance including similarity processing along with a detailed daily, weekly and monthly report to the client. The daily report includes easy visualisation of graphs to clearly show out of spec channels, equipment and vibrators along with the recommended action to be taken to rectify issues.

SMRefract is also part of the suite and is a multi-featured QC tool which allows for viewing of refraction statics together with shot display and filter capability. SMSim3 Vibrator Similarities Analysis program processes and analyses vibrator similarities. Vibrator similarities compare the actual Vibroseis signal ground response with the Pilot or Reference sweep and are the definitive test of vibrator performance in all terrain types.

The GRCSeisQC™ system reduces the overall risk of personnel exposure in the field, whilst maintaining the highest possible data integrity from anywhere in the world.



GRCSAFEINSP™ MOBILE HSE INSPECTION APP

The application allows the user to perform safety inspections on a handheld device, and works on all IOS and Android devices. The inspections cover all aspects of seismic activities, including vehicles, camps, camp electrics, workshops and offices, as well as seismic operations in the field. The inspections can be connected to the client's own database for inspection results in real time and instantly generates reports online and in PDF and can be adapted to the needs of the clients.

GRCSEISTRAIN DDT™ OFF-ROAD DEFENSIVE DRIVER TRAINING

Driver Training to the highest possible standards on a Seismic Crew / Oilfield Environment. The aim of the training is to provide our clients with trained drivers that can safely handle an off-road vehicle in any environment.

We have two highly qualified driver trainers that have combined experience of 58 years as dedicated driver trainers in remote areas.

GRCSURVQC™ SURVEY QUALITY CONTROL SERVICES

We at Geo Resources Consultancy International believe that a Survey QC is paramount in ensuring that your seismic survey is carried out accurately, on budget and on time, providing our client with a high degree of confidence that their survey data has been produced to the highest possible standard.





GRCVEHICLEINSP™ VEHICLE INSPECTION SERVICE

It is very common these days for seismic crews by necessity to operate a large fleet of vehicles in order to work efficiently. This is particularly the case for crews working on large scale desert projects in the Middle East where the total number of light and heavy vehicles can be in excess of 200. Keeping fleets of this size operational is a major task and requires comprehensive maintenance schedule planning with extensive facilities and qualified personnel to carry out the service and repair work.

In some countries the minimum standards required with regards to the safety of land transport in Oil & Gas operations are well defined and documented, and controlled by regulatory boards and the traffic laws of the country. In other countries there is very little regulatory control but ideally clients should have similar in-house standards that contractors are required to follow to ensure the integrity and operation of their vehicle fleet.

Where minimum standards are regulatory controlled, the standards will often include a number of aspects of vehicle safety that all contribute to minimizing the risk of a road traffic accident (RTA). These are typically broken down into 3 categories: **1) Driver, 2) Vehicle** and **3) Monitoring and Management System**.

★ Driver

For the type of vehicle intended to drive, drivers should be eligible, licensed, qualified, trained and medically fit. The driver should also understand the rules of the road whether this be blacktop or off-road. Driver requirements will vary depending on vehicle type and environment with more specific requirements required for heavy vehicle drivers, bus drivers, ambulance drivers, vibrator drivers, and heavy plant (bulldozers, graders, etc.) drivers.

★ Vehicle

Vehicles must be licensed, fit for purpose and capable of working in the terrain encountered in seismic exploration prospects. Minimum vehicle standards should include generic requirements for all types of vehicle plus other requirements specific for the type of vehicle and the working environment, for example: 4WD vehicles, heavy vehicles, tankers, trailers, buses, vibrators, emergency vehicles, heavy plant, etc. In some countries the requirements are referred to as a Roadworthiness Assurance Standard. New vehicles should meet this and once operational all vehicles should be maintained to this level, verified by regular inspections and serviced as per manufacturer's recommendations.



✦ **Monitoring and Management System**

The purpose of a Monitoring and Management System is to ensure that rules of the road are being followed and adhered to, and that drivers are driving safely and defensively. It is therefore recommended that vehicles are fitted with an IVMS (In-Vehicle Monitoring System) to record a driver's performance, and that a robust Journey Management System is in place to track all vehicle trips.

It should be noted that the above standards should be applicable for all vehicles related to a seismic operation irrespective of whether the vehicles belong to the seismic contractor, subcontractors or service providers.

For the most part the benefit to both clients and contractors of having a fleet of fit for purpose vehicles in good working condition driven by qualified drivers is clear. Well maintained, roadworthy vehicles driven safely and closely monitored will inevitably result in fewer RTAs. Sufficient vehicles will always be available to meet operational requirements thus ensuring a smooth running, efficient project with no downtime or lost productivity due to vehicle shortages. Safety and productivity run hand-in-hand.

Geo Resources Consultancy International offers a Vehicle Inspection service to check and verify all of the above, thus providing clients with a high degree of confidence that all land transport related issues are fully addressed and of an acceptable standard. Inspections can be tailored to fit regulatory criteria or otherwise depending on client requirements and specifications. Inspections will by necessity include physical vehicle checks using comprehensive checklists (tablet based and database linked), review of vehicle maintenance schedules and records, driver training and qualification checks, and review of IVMS and Journey Management implementation and data. All Geo Resources Consultancy International consultants have at least 15 years' experience in seismic exploration with a thoroughly knowledge and understanding of land transport safety. Geo Resources Consultancy International is also happy to advise, recommend and propose methods to check contractors fleet management systems if clients do not have their own specific standards in place.

The goal is to achieve an RTA frequency rate of Zero.



GRCPROJECTSCOUT™ ADVANCE SCOUTING SERVICE

Scouting a project area is a critical component of seismic survey. If HSE events can be anticipated and mitigated in advance, then lives can be potentially saved; for example, preventing the rollover of vehicles and vibrators working in difficult terrain on 24 hour per day operations.

GRCProjectScout™ is Geo Resources Consultancy International's comprehensive seismic project scouting service that identifies and advises on unforeseen circumstances in any area and in any terrain to identify and reduce HSE and business risk.

The scouting of any project is critical to evaluate the performance and efficiency of the crew. Before embarking on a scouting project, we consider all the possible factors based on the terrain, infrastructure and the environment. A terrain model using the best available satellite imagery and DEM data is produced and used as the first step to evaluate the terrain classification and expected project HSE risks.

Once the basic lay of the land has been identified a full scale field scout should be carried out. We can provide experienced professionals to carry out such a scout but ideally they should be accompanied by client and contractor representatives if available at the time. The purpose of the field scout is primarily to confirm the pre-determined terrain classification but should also be used to identify a number of other project specific details including:

- ✦ Stakeholders requiring engagement.
- ✦ Permitting and local community issues.
- ✦ Emergency response and nearest medical facilities.
- ✦ Security issues.
- ✦ Potable water sources.
- ✦ Fuel supply.
- ✦ Sewage and waste disposal facilities.
- ✦ Location of possible camp sites.
- ✦ Infrastructure details that could affect the survey such as pipelines, oil field facilities, overhead powerlines, construction activities, etc.
- ✦ Areas where a PTW is required.
- ✦ Communications, availability of GSM signal, need for Vsat.

After completion of the scout Geo Resources Consultancy International will provide a full scout report to the client and contractor detailing all the findings and recommendations.



GRCTECHINSP™ SEISMIC CREW TECHNICAL INSPECTION SERVICE

The technical ability of a seismic crew, in terms of instrumentation and personnel, is critical to the success of a seismic exploration program, but this is not the whole story. A crew cannot work without adequate resources to support the data acquisition process. This is usually provided by a base camp with accommodation and an operational infrastructure which should not only be sufficient to support the crew but should also meet established industry standards for HSE and remote facilities. In addition to Geo Resources Consultancy International's Technical Audit package for independently verifying the recording instrumentation, Geo Resources Consultancy International also offers the **GRCTechInsp™ Seismic Crew Technical Inspection Service** to check a seismic crew's overall readiness to start field operations. This readiness review can be an integral part of a client's pre-startup crew acceptance process.

Seismic crews these days can vary in size considerably from small compact crews shooting 2D seismic lines through jungles and forests to mammoth size crews of 1,000+ personnel shooting huge 3D surveys across vast deserts. The HSE and operational resources required for these differing size crews can therefore vary significantly, but irrespective of the size the standards should always be same. At a minimum the standards should meet client and/or industry specifications for the size of crew provided and support required. Clients very often provide their own contractual specifications for HSE, operations, camps and facilities based usually on local regulations and international standards.

At a minimum these will meet the standards established by the IOGP (International Association of Oil & Gas Producers). If a company does not provide its own specific documentation then standards should meet those of the IOGP.

On surveys that require advance work remote from base camps or have difficult access to work areas that would require very long travel to and from the work site, seismic crews often deploy localized fly camps to support the operation in such situations. The standards for fly camps should be no different to those of base camps. Fly camp inspections can also be carried out as part of the Geo Resources Consultancy International inspection service if requested by a client.

The purpose of Geo Resources Consultancy International's Seismic Crew Technical Inspection Service is therefore to check the readiness of a crew to start work. This involves inspecting all aspects of the crew and the camp to check adequate equipment and facilities are available, equipment is fit for purpose, personnel are trained accordingly for all job tasks, and the work can be carried out safely and efficiently. Fixing problems prior to startup is far easier than fire-fighting once recording has started. Inspections and verifications will be measured against the specifications and standards contractually required by the client.



GRCTECHINSP™ SEISMIC CREW TECHNICAL INSPECTION SERVICE (continued)

After completing the inspection, issues and problems identified will be discussed with the contractor and client representatives, and an RWP (Remedial Work Plan) will be established encompassing all the action items required to rectify the points identified. Action items will be assigned to the appropriate responsible persons and will be given realistic time constraints for completion, as agreed with the client and contractor. A summary report with recommendations will be produced initially, to be followed within 14 days by a full inspection report.

Should a Geo Resources Consultancy International representative be available on the crew for a period of time after the initial inspection, on-site follow up and verification of action item closure can be done by the infield representative. If this cannot be done then as part of the service Geo Resources Consultancy International would request periodic feedback from the contractor on remedial action progress so that the inspection can be tracked to completion and closure of all the items. This would require the contractor to provide Geo Resources Consultancy International with photographic and/or documented evidence for each action item closed.

Geo Resources Consultancy International appreciates that client's requirements and crew types vary and thus the flexible nature of the Seismic Crew Technical Inspection Service allows it to be tailored exactly to fit client's needs.

The Seismic Crew Technical Inspection scope of work shall include (as required), but not be limited to:

- ✱ HSE overview of all operations and facilities.
- ✱ Full camp inspection covering general camp layout, accommodation, kitchens, messing facilities, food preparation, food storage, food quality, ablutions (showers and toilets), offices, potable water supply and storage, fuel storage, etc.
- ✱ Recording crew inspection covering recording equipment overview, parameter checks, field crew readiness, procedures, etc.
- ✱ Survey crew inspection covering equipment, procedures, etc.
- ✱ Workshop inspections (mechanics, vibrators and recording) covering equipment and tools, maintenance and testing, procedures, spare parts availability, etc.
- ✱ Camp electrics inspection covering generators, junction box/panels, grounding system, RCDs and safety critical protection, etc.
- ✱ Road transport and vehicle inspections (light, heavy, vibrators, sub-contractors).
- ✱ VTS (vehicle tracking system) and IVMS (in vehicle monitoring system) availability and operation.
- ✱ Clinic/medical inspection covering equipment, medication and drug supply, medic/doctor competence records, first aid training records, ambulance and emergency vehicles, emergency procedures, etc.
- ✱ Waste and sewage inspection covering storage on site, disposal off site (hazardous and non-hazardous waste), STP availability, etc.
- ✱ Communications including FM radios, GSM availability and coverage, Vsat and internet connectivity, camp network setup, virus security, etc.
- ✱ Fire prevention including warning systems, fire alarms, fire-fighting equipment, muster point setup, etc.
- ✱ Personnel training record checks including HSE training, job specific departmental training, competency training for specific jobs such as vehicle mechanics, electricians, welders, AC repair, etc.



GRCTECHINSP™ SEISMIC CREW TECHNICAL INSPECTION SERVICE (continued)

For all areas inspected an individual readiness approval is issued once all criteria are in place. As already mentioned the ideal time to carry out a readiness crew inspection is prior to a survey starting. It can also be useful, however, mid-term on long contracts to check whether standards have been maintained or failings have started to occur which need to be rectified. Clients can also utilize this inspection service on established crews which may not have been rigorously audited at startup. It is far better to identify and correct issues at a later date than not at all.

It is Geo Resources Consultancy International's aim to work with and not against the contractor to achieve the best possible outcome for the client in terms of crew efficiency and seismic data quality. The purpose of a technical inspection is to identify and rectify any crew, and importantly HSE, deficiencies in order to maximize a crew's performance. Advice will be provided by the Geo Resources Consultancy International representative and recommendations made where necessary to improve best practices on the crew.

All Geo Resources Consultancy International Seismic Crew Technical Inspections are carried out by industry professionals with a wide knowledge base, thus providing the client with the guaranteed readiness assurance necessary to allow a crew to start work and operate safely and efficiently in a potentially harsh and remote environment. A suggested recommendation to clients and customers is to tie in a Seismic Crew Technical Inspection with a full Technical Audit of the recording instrumentation, thus completing all the necessary checks and verifications for a crew startup at the same time.



GRC PROMOUNT™ MOUNTAINEERING AND STEEP TERRAIN SPECIALISTS

In order to facilitate safe and efficient operations in rugged and mountainous environments, Geo Resources Consultancy International mountaineers and steep terrain specialists can provide the expertise necessary to help clients achieve this. They have extensive experience working on geophysical surveys around the globe and clients will benefit from a suite of services they can provide including in-depth scouting reports, detailed project hazard and terrain analyses, and tailor made risk assessments. Pre-task evaluation and identifying and training of competent crew personnel capable of working in such environments are also critical aspects of the job provided by the specialists.

In the field, Geo Resources Consultancy International mountain specialists acting in a field supervisory role work proactively to optimize crew performance and reduce the risk of incidents. If accidents do occur they can integrate readily into existing Emergency Response Plans and teams, being familiar with mountain search and rescue procedures. Many of our specialists are also Advanced First Aiders able to immediately respond to emergency medical situations should they arise.

In extremely steep terrain, mountaineers using specialized equipment can assist in survey and recording operations to ensure that skipped points are minimized and the subsequent loss of data quality is reduced as much as possible. It is highly likely that in such extreme terrain the work must be carried out only by specialist mountaineers as exposure to crew personnel with inadequate training would be too risky and dangerous. One of the critical tasks of mountaineers is to identify these specific zones as part of the terrain assessment. Factors that affect these decisions include slope steepness, rock quality, fall hazard potential, weather, heat, water and repeated use of routes. Mountaineers must be prepared to re-classify terrain on a regular basis and any safety concerns that result from changing terrain conditions would be discussed in all safety orientations.

As geophysical operations in mountain regions can potentially impact the environment in these sensitive areas, Geo Resources Consultancy International mountain specialists can advise on best practices to minimize this and are fully conversant with IOGP guidelines designed to reduce the environmental footprint caused by seismic activities in these regions.



GRCTECHAUDIT™ LAND SEISMIC TECHNICAL AUDITING

The integrity and quality of recorded seismic data is critical to the success of a seismic acquisition program. In order to achieve the best quality seismic data, recording instrumentation and seismic sources should perform as per manufacturer's specifications. This will ensure that all controllable aspects of the acquisition process are functioning as best possible and thus obtain the best response from less controllable aspects such as ground and subsurface conditions. It is therefore very important to check this technical functionality and correct any issues before the survey starts.

Seismic recording instruments have built in diagnostic software to check system integrity and run a suite of tests to check the status of the ground equipment. The instrumentation is also capable of monitoring Vibroseis and explosive source attributes to ensure the quality of the generated seismic signal meets client and industry standards. However, this is not the whole story and it is highly recommended that an independent assessment of instrumentation and source performance is done to verify and comply with manufacturers' specifications and thus provide the client or customer with the necessary added assurance.

Geo Resources Consultancy International offers the **GRCTechAudit™ Technical Audit Service** for land seismic specifically for this purpose to independently check the seismic equipment in the field meets the technical specifications.

Alternatively, if travel conditions dictate otherwise and auditor field presence is not possible, technical audit data can be acquired by the seismic contractor and sent to a Geo Resources Consultancy International engineer for independent processing, evaluation and feedback. All Geo Resources Consultancy International engineers are very experienced and knowledgeable and thus capable of quickly identifying any issues and deficiencies that would need to be rectified by the seismic contractor before the survey could start.

Technical audits are primarily carried out pre-survey startup but can also be useful post-survey and mid-survey on long term projects to confirm technical compliance throughout the period of a survey as equipment problems can occur anytime.

The Geo Resources Consultancy International land technical audit can be utilized for all types of recording systems (conventional, nodal, etc.) and all types of seismic energy sources (Vibroseis, explosive, etc.). Nodal recording systems in particular are at the forefront of new technology for land acquisition and the methodology of nodal system functionality can lead to a false sense of security. Recording is in effect "blind" with no real time data QC possible so it is vital that all nodes are fully charged and functioning correctly pre-deployment. As part of the technical audit process the node parameter setup, firmware consistency, and self-test compliance and schedule will all be checked and confirmed by the Geo Resources Consultancy International engineer. Post-deployment checks on the nodes will also be carried out before the start of acquisition is permitted.



GRCTECHAUDIT™ LAND SEISMIC TECHNICAL AUDITING (continued)

The Geo Resources Consultancy International engineer will provide all the necessary equipment including a Sandwich Box vibrator tester to complete the audit and will be equipped with industry leading **Seismatters™** software to process all the data acquired during the audit. At the end of the field visit the engineer will discuss the results with Contractor and Company representatives and generate a summary report for the Company. This will be followed within 14 days by a full audit report.

The technical audit scope of work shall include, but not be limited to:

- ✱ Recording system: accuracy, acceptance and full set of instrument tests.
- ✱ Vibroseis source: full sets of tests to determine the performance of the vibrators using an independent vibrator test system (Sandwich box); vibrator visual inspection and critical operating system checks; GPS positioning verification, accuracy and repeatability.
- ✱ Explosive source: full set of tests to determine the performance of the shooting (detonation) systems and timing accuracy.
- ✱ Geophones: visual inspection and full set of tests on a representative sample of geophones using a Sensor geophone tester.
- ✱ Nodes: parameter setup and firmware confirmation, self-test checks and schedule setup, data management and charging system review, metadata output as per client requirements, deployment methods and ground coupling checks, etc.
- ✱ Other equipment as required e.g. refraction/uphole recording systems.
- ✱ Survey equipment (available if requested): review of equipment checks, calibration tests on GPS receivers, and GPS static control networks.
- ✱ HSE is a primary concern on all seismic field crews and as a matter of course all Geo Resources Consultancy International engineers are experienced in all aspects of HSE management systems applicable to seismic operations. They will observe and report/advise on any HSE awareness issues or concerns observed during the audit.



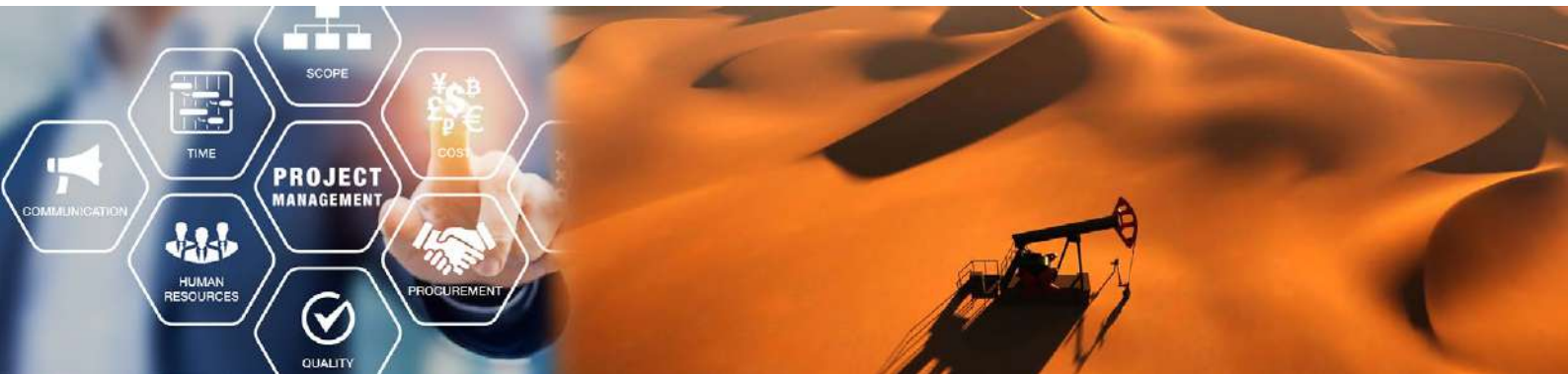
GRCTECHAUDIT™ LAND SEISMIC TECHNICAL AUDITING (continued)

Why use Geo Resources Consultancy International for technical audits?

- ✦ Comprehensive independent analysis of equipment performance.
- ✦ Quick identification of equipment deficiencies allowing timely rectification of issues.
- ✦ Carried out by highly experienced and knowledgeable engineers.
- ✦ Technical data processed and analyzed using leading edge Seismatters™ software.
- ✦ Provides the client and customer with guaranteed technical assurance of the systems being used.
- ✦ All our engineers have worked extensively with the latest in-field technology.
- ✦ All our engineers will produce a confidential report that can be used for implementing improvements.
- ✦ The overall aim of the audit is to work alongside the contractor's personnel to improve data quality, and suggest improvements for the long-term benefit of the crew and client.

It is Geo Resources Consultancy International's aim to work with and not against the contractor to achieve the best possible outcome for the client in terms of crew efficiency and seismic data quality. The purpose of a technical audit is to identify and rectify any equipment deficiencies in order to maximize a crew's technical performance.

The Geo Resources Consultancy International engineer will also evaluate the competency of the crew key personnel and review maintenance and quality control procedures. Advice will be provided and recommendations made where possible to improve best practices and overall crew productivity.



GRCPROJMANAGEMENT™ PROJECT MANAGEMENT SERVICE

Seismic exploration is the single and most important geophysical technology in the exploration for energy resources. A successful seismic survey is dependent on the overall quality of the acquired seismic data. Professional project management of the survey is a key component of this, and Geo Resources Consultancy International can provide highly competent and well qualified individuals for this purpose.

Project management is the practice of leading the work of a team to achieve goals and meet success criteria at a specified time. The primary challenge of project management is to achieve all of the project goals within the given constraints. The primary constraints are usually scope, time, quality and budget. Ideally the project manager should be on-board pre-project startup, acting as the link between the client and contractor, so that communication protocol is clearly identified and issues can be discussed and addressed expeditiously between all parties.

The objective of project management is to produce a complete project which complies with the client's objectives. In many cases the objective of project management is also to shape or reform the client's brief to feasibly address the client's objectives. Once the client's objectives are clearly established they should influence all decisions made by other people involved in the project – for example project managers, designers, contractors and sub-contractors. Ill-defined or too tightly prescribed project management objectives are detrimental to decision making.

All Geo Resources Consultancy International project managers have at least 15 years' experience in seismic exploration with a thorough knowledge and understanding of the business. Their experience includes managing seismic acquisition projects for numerous major, national and independent oil and gas companies. They work closely with the client and contractors to achieve operational excellence with full adherence to HSSE in every aspect, from project inception to completion and beyond.

All Geo Resources Consultancy International specialist consultants follow a strict code of professional conduct, exhibiting and upholding professional and personal integrity at all times, ensuring compliance with all relevant legislation and regulations in all countries where we operate.



Geo Resources Consultancy International (UK) Ltd
Marine Division

The primary aim of our Marine Division is the provision of an **Integrated Approach** to project management for all types of marine survey and processing operations undertaken by our clients.





OUR **GRCI** MARINE DIVISION
PRIDES ITSELF ON ITS THREE
CORE PRINCIPLES: **EXPERIENCE,**
KNOWLEDGE AND **ABILITY.**

EXPERIENCE

Having first hand experience of exploration activities allows us to understand the requirements and assist our consultants.

KNOWLEDGE

Knowing what our clients expect allows us to select the right consultants each time for every project.

ABILITY

Having the ability to provide a global reach for our organization through our network of associate offices and agents.



GLOBAL COVERAGE

GRCI's Marine Division has offices and agents worldwide allowing us to act for clients on every continent ensuring integrity and consistency of our service wherever they may be based.

GRCI Marine Offices

- London, UK
- Naples, Florida
- Houston, Texas
- Temporary branch offices in Kyrgyzstan and Tajikistan

GRCI Marine Agents

- Bangkok, Thailand
- Cairo, Egypt
- Ras Al Khamaih, UAE
- Islamabad, Pakistan
- Jakarta, Indonesia
- Kuala Lumpur, Malaysia
- Lagos, Nigeria
- Maputo, Mozambique
- Mumbai, India
- (Oman, Head Office)**
- Rio de Janeiro, Brazil
- Yangon, Myanmar



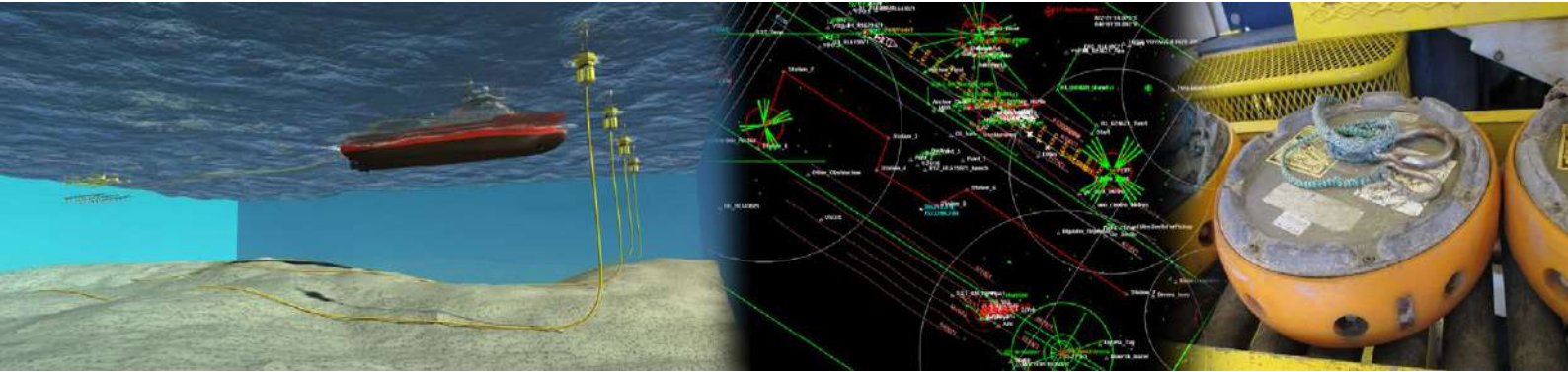
EXPERIENCE

We have managed just under 600 projects to date covering all aspects of the seismic exploration project, from pre-planning and bid evaluation to project management and field QA/QC.

- ✱ 2D, 3D, WAZ Towed Streamer Surveys
- ✱ 4D Life-of-Field (LoF)
- ✱ TZ, OBC, OBN
- ✱ CSEM & MT
- ✱ Site Survey
- ✱ Data Processing QA/QC
- ✱ Interpretation

SERVICES

- ✱ Project Management & Survey Design
- ✱ Contract & Bid Evaluation
- ✱ Technical Audits
- ✱ 2D | 3D | 4D | OBS | Marine & TZ Seismic Acquisition QC
- ✱ Gravity and Magnetics Survey Supervision
- ✱ MMO & PAM Services
- ✱ Seismic Data Processing Supervision
- ✱ HSE Supervision & Management
- ✱ Marine Geotechnical Project Management
- ✱ Hydrographic & Metocean Survey Supervision
- ✱ Interpretation Services
- ✱ Drone Surveys



SURVEY DESIGN AND PROJECT EVALUATION

Our Marine Division has multi-discipline consultants for all types of project analysis.

- ✳ Survey Design
- ✳ Geophysical Evaluation
- ✳ Acquisition Timing Analysis
- ✳ Tender Evaluation

TECHNICAL AUDITS

Our Marine Division provides experienced consultants for independent technical audits of land, marine or transition zone surveys.

MARINE SEISMIC ACQUISITION QC

Our Marine Division has multi-discipline consultants for all types of marine seismic operations.

- ✳ 2D & 3D Towed Streamer
- ✳ 4D Life-of-Field Imaging
- ✳ Ocean Bottom Seismic
- ✳ Nodal Seismic
- ✳ Electro-Magnetic Seismic
- ✳ BroadBand Seismic
- ✳ Non-Seismic Techniques



OCEAN BOTTOM AND NODAL SEISMIC QC

Our Marine Division has consultants specializing in Ocean Bottom and Life-of-Field surveys.

- ✳ Multi-source Ocean Bottom
- ✳ 4D Life-of-Field Matching
- ✳ Crowded Field Experience
- ✳ Nodal Seismic

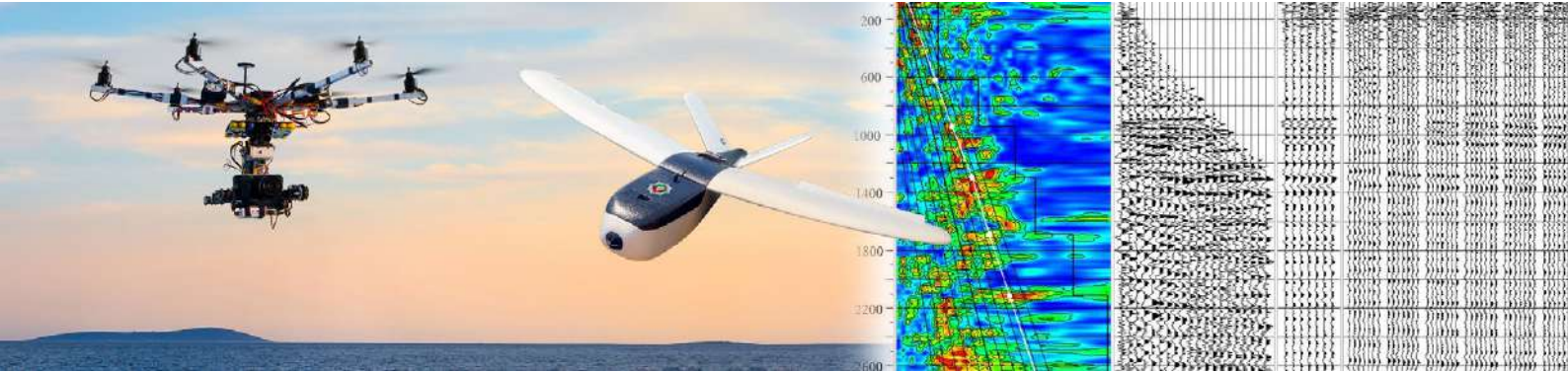
MMO & PAM SERVICES

Our Marine Division provide Marine Mammal Observers (MMO) and environmental specialists, as well as Passive Acoustic Monitoring (PAM) systems.

- ✳ Trained and experienced MMO and PAM operators.
- ✳ Our PAM operators are experienced Marine Mammal Observers as well as trained Passive Acoustic Monitoring personnel, with professional qualifications in Marine Biosciences.
- ✳ PAM equipment.

Vanishing Point PAM System

- ✳ Fully compliant with current JNCC guidelines.
- ✳ Detects a wide range of marine mammal vocalisations.
- ✳ Systems supplied with 100% spares.
- ✳ GPS provides an exact time and location of mammal sightings and a record of the vessel's position and monitoring effort during the survey.
- ✳ Vanishing Point system is user-friendly, quick and easy to set up and operate and does not require additional 'system specific' training.



SERVICES QA/QC APPLICATIONS

- ★ MultiSeis/MultiStudio
- ★ FGPS PITools & SeisPOS (for conventional and OBS Surveys)
- ★ Geometis Suites
- ★ Testif-I & Sandwich Box Vibrator Test System
- ★ ProMAX
- ★ Vanishing Point PAM

DRONE SERVICES

Our Marine Division also offers drone services capable of obtaining 2D and 3D images in RGB bands, NIR (near infrared), thermal and polarized images.

- ★ The system is also capable of producing Geo-referenced images for mapping, calculating volumes and areas. It can also be used for monitoring pipelines, showing any erosive processes present, and the structural fidelity of the pipelines.
- ★ The drone can provide easy technical solutions and reduce costs and operating risks. It provides for increased efficiency for field information operations. It can also assist in mitigating operational risks providing an improvement in HSEQ.



QHSE

Our Marine Division is committed to avoiding injury to, and the preservation of, the Health and Safety of its employees, consultants, contractors and any other persons who may at any time be affected by conducting geophysical operations, in a manner that provides optimum protection, by demonstrating HSE leadership and adopting strict Health and Safety system management and Environmental consideration, while in the pursuit of business excellence.

Our HSE-MS plan is tied in with GRCI Corporate Policy.



**SAFETY
EXPERTISE
ACCURACY
AND NEW
TECHNOLOGY**



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ENVIRONMENTAL & EARTH
SCIENCE CONSULTANTS

الموارد للإستشارات الجيولوجية العالمية
مستشارون في علوم الأرض والبيئة



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