BELGIUM

Elia Mog 2 Offshore Wind power - construction of a new grid infrastructure

CHILE

Logging at Sierra Gorda Copper Mine - largest mining operation in recent years

SAUDI ARABIA

An innovative provider using Robertson Geo conventional & imaging tools

ROBERTSON GEO

Unlocking Your GeoData

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GLOBAL GEODATA NEWS

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AQUIFER THERMAL ENERGY STORAGE (ATES)

MINERAL INVESTIGATION - JAIPUR

OPTICAL TELEVIEWER

VOLCANO... *WHAT* VOLCANO?

Street art and state-of-the-art On-site training in Manila

Robertson Geo client AMH purchased PSLogger® probe and surface and deployment equipment for logging city centre boreholes as part of a new underground subway system. A three day training and commissioning schedule was provided on various sites by Robertson Geo Logging Engineers.

INSIDE:
TWO PAGE EDITORIAL INSERT

On Solid Foundations

The Pyramid of Support for Every Logging Job - a complete Service Provider

Borehole NMR Gains Traction with RGS Contract Awards

ROBERTSON GEO'S COLLABORATION with Vista Clara Inc, introducing the Javelin JPY238 NMR probe into the UK market is proving successful with three significant contracts being confirmed for hydrogeological investigation.

Work has already commenced on a major contract for a flood risk management scheme in Kendal, potentially for around 50 boreholes, with NMR logging being included in the probe suite for every borehole so far *(see page 7)*. An innovative approach has been taken for the drilling whereby two boreholes are drilled adjacent to each other with one being cased to support the unconsolidated upper layers and the second being open hole into the consolidated formations. Data from the multiple frequencies of investigation has been processed to provide profiles of water content distribution (clay, capillary and mobile), hydraulic conductivity and transmissivity.

A further contract for NMR has been awarded, forming part of an ongoing carbon sequestration research project in Nottinghamshire, England at a site where Robertson Geo has previously provided logging services and the use of NMR logging is under consideration within the HS2 rail project, an ongoing contract for Robertson Geo.

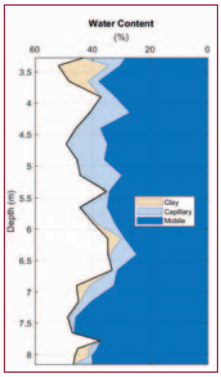


Fig 1: Example Water Content Profile for unconsolidated material.

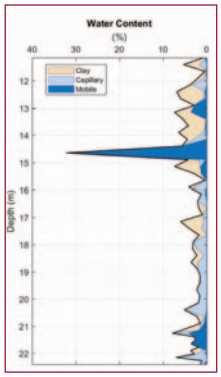


Fig 2: Example Water Content Profile for a consolidated formation.

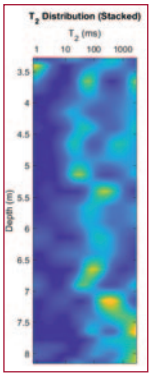


Fig 3: Example T2 Distribution.

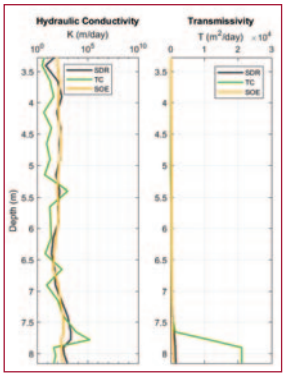


Fig 4: Example Hydraulic Conductivity and Transmissivity profile.

OPTICAL TELEVIEWER borehole inspection

TWO DAYS, TWO locations, six boreholes to inspect. Robertson Geo completed the inspection of three boreholes per day.

All boreholes are existing groundwater monitoring wells surrounding a producing oil well. The boreholes are PVC lined to total depth and it was the integrity of the PVC lining and the exact depths at which the lining became slotted that the client needed clarity on.

With all the boreholes being inaccessible by vehicle, Robertson Geo used its most compact, highly mobile logging unit consisting of the Mini deployment winch, tripod and Micrologger2 surface interface system.

The High-Resolution Optical Televiewer (Hi-OPTV) displayed the integrity of the PVC lining and the exact depths at which the lining became slotted. These boreholes were drilled some twenty years ago with the client holding very little knowledge to their current depths, stability, and the condition of the PVC prior to these logs conducted by Robertson Geo.

Elia Mog 2 Offshore Wind power
Ostend Belgium

Above: An impression of one of the installations.

ELIA IS PLANNING to develop the Modular Offshore Grid (MOG) 2 project that includes the construction of a new offshore grid infrastructure to connect new wind farms in the Belgian part of the North Sea to the mainland.

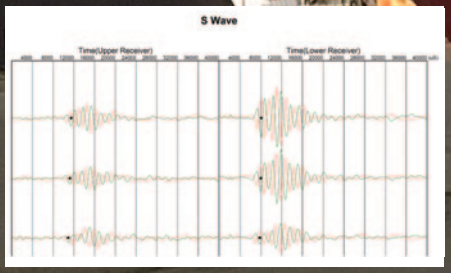
In addition to the MOG 1 project that is currently being developed and expected to bring 2.3 gigawatts (GW) offshore wind power by 2020, MOG 2 project aims to add between 1.7 GW and 2.04 GW. The project is part of Belgium's Energy Strategy to create new zones for electricity production and transmission with the objective to reach a capacity of 4 GW by 2030. The project will enhance the integration of renewables and support the country's climate goals.

The Offshore 2 (or MOG II) project is being developed to provide new grid infrastructure, including high-voltage platforms and cables, for the transmission of electricity generated by future offshore wind farms to the onshore grid.

AS PART OF the preliminary geotechnical surveys, Robertson Geo conducted PS Logger® operations on three 80m boreholes over a seven-week period. The geology encountered was moderately stiff clay for all depths surveyed.

The PS Logger® probe measures P (compression) and S (shear) wave velocities in a single borehole without the need for external energy sources, making it simple and quick to deploy. When combined with bulk density values (from sample tests conducted by the onboard laboratory) small strain moduli (Young's, Shear and Bulk) can be calculated using simple formulae.

Data is logged and processed on site by the Engineer. Full waveforms are recorded digitally at acquisition time across 6 channels (P wave, S wave left & S wave right at the near and far receivers) at a predetermined sample rate as low as 2.5µsec. The sample rate is carefully selected to be as small as possible to provide the best resolution but high enough to capture the arrivals within the listening window. Using the acquisition software, the waveforms can be displayed, scaled and filtered to allow for the picking of the first arrivals at each receiver.



Example of shear wave data.

MINERAL INVESTIGATION - JAIPUR

The Geological Survey of India (GSI)

GSI HAS BEEN using Robertson Geo logging technology throughout India for over 30 years.

The Mineral exploration and mining history of India is closely related to the establishment of the Geological Survey (GSI). Mineral resource assessment projects include Ferrous Minerals, Base Metal, Precious Metals & Minerals, Non-Ferrous and Strategic Minerals and Industrial & Fertilizer Minerals. Lately, GSI has taken the important policy decision of extending its regional work to a detailed exploration stage in potential development areas, ensuring that comprehensively explored areas can be offered to the stakeholders for exploitation.

GSI is using a range of Robertson Geo tools for its exploration projects including IP, Magnetic Susceptibility, Spectral Gamma, Resistivity, Density, Neutron, etc. It also has a logging depth deployment capability of over 1,800m.

Recent projects have included the economic feasibility of potash mining in the Hanumangarh district of Rajasthan. After preliminary exploration GSI has found potash reserves of 133 million tonnes in one area of the district. Another long-time Robertson Geo client 'Mineral Exploration Corporation Limited' (MECL) will now undertake a more detailed study of the reserves.

Logging at **Sierra Gorda Copper Mine** in **Chile**

SIERRA GORDA SCM is the largest mining operation started up in recent years in the Antofagasta Region of Chile.

Now mining copper and moly concentrate, with over 115,000 tons of ore being processed daily, producing 108,000 tons of copper per year.

Robertson Geo client Datawell logged boreholes up to 1,800 meters depth, using a suite of Robertson Geo geophysical probes and surface equipment. The High Resolution Acoustic Televiewer (HRAT) and High Resolution Optical Televiewer (Hi-OPTV) together with the 3-Arm Caliper were the principal tools of use for the project.

The logs were acquired for ongoing mining operations, investigation, and subsurface characterization at the site.

We use Robertson Geo conventional & imaging tools for Water, Mining and Geotechnical applications

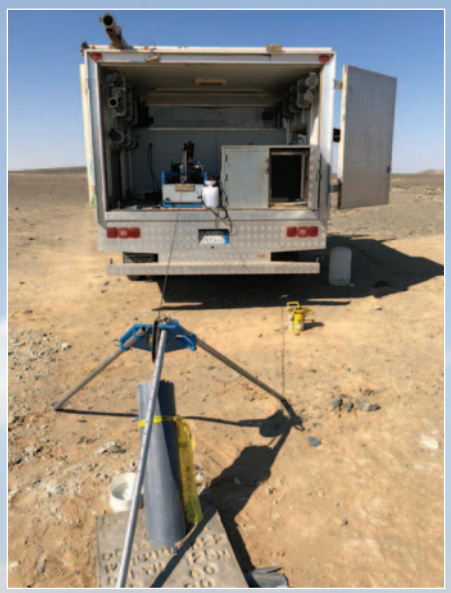
TDS is a Saudi Company, an innovative provider for all water issues (studies, consulting, and services) www.tds.com.sa

It was first established in 2012 as a specialist provider for well logging and water well services. Water exploration, geophysics, hydrogeological studies, and desalination services were added to its portfolio in 2014, and the demand for TDS expertise opened centres across the Kingdom of Saudi Arabia and further introduced monitoring of surface and ground water facilities. In 2019 TDS expanded its areas of operation with locations in Dubai and Oman. It currently has 80 employees over its various locations.

"We use Robertson Geo conventional & imaging tools for Water, Mining & Geotechnical applications. TDS has logged wells throughout Saudi Arabia and worked with many projects for the Ministry of Environment, Water and Agriculture (MEWA) and Ma'aden.

In a project with Ma'aden company, we used Robertson Geo's density (FDGS) & electric logging (ETLG) tools. The target of the project was to identify gold bearing layers in 500 wells drilled at As suq and Mahd Ad Dhahab gold mines. Using density and electric logging tools, TDS surveyed 500 wells (depths ranging from 100-600m) within a 10-month period."

Ahmed Shaheen, Senior Geophysicist.



MA'ADEN GOLD PROJECT

Gold enjoys a special status at Ma'aden. It provided the foundation of subsequent growth and diversification into the base metals.

The Mahad Ad Dhahab Mine (translated as 'cradle of gold') has a history reaching back to the beginning of recorded time, with evidence suggesting that the operation was actively mined as early as 3,000 years ago. Some of the charcoal is as much as 3,000 years old indicating that the mine was active during the reign of King Solomon.

Gold deposits are located throughout the Central Arabian Gold Region of Saudi Arabia, a large geological area extending from the Red Sea coast to the middle of Saudi Arabia. It is a challenging region with its remote location and limited water availability.

To enable its Gold operation, Ma'aden developed and operates a 450km water pipeline, bringing treated wastewater from Taif City in Makkah Province to the mine sites. This environmentally sustainable solution is the first instance of the large-scale use of treated wastewater for industrial purposes in Saudi Arabia.

Mahd Ad Dhahab Mine: Mahd Ad Dhahab Mine is an ancient gold mine dating back 3,000 years. Modern underground production commenced in 1988. The Carbon-In-Leach plant produces dore and concentrate. Mahd Ad Dhahab Mine produced around 21,000oz of Gold in 2019.

With the aid of advanced technology such as wireline logging with gamma, caliper and optical televiewer tools, the exploration teams were able to improve efficiencies in identifying mineralised zones without waiting for laboratory-based assay results.

As Suq Mine: As Suq Mine is an open pit gold mine that commenced production in 2014, using heap leach technology to produced dore. As Suq Mine produced approximately 19,000 ounces of Gold in 2019.

On Solid Foundations

THE PYRAMID OF SUPPORT FOR EVERY LOGGING JOB

Ancient civilisations, from the Egyptians to the Maya peoples and geographically beyond, recognised the inherent strength of the pyramid when building to ever greater heights. While their motivations may seem somewhat bizarre to modern cultures, the pyramid concept of building on solid bases provides a useful analogy for how Robertson Geo Services (RGS) approaches the provision of market leading logging operations.

Clients of RGS experience mainly the top of the pyramid which includes the field operations and the provision of high-quality data. Here we highlight some of the systems necessary to underpin what may appear to be a relatively simple service provision.

Regulations and External Standards

Over the years RGS has seen an ever-increasing adoption of the regulations and standards that apply to the conduct of logging operations. As designers, developers and manufacturers of all its own equipment Robertson Geo continue to meet similarly stringent standards to compete in the worldwide marketplace.

RGS work in accordance with many standards including "D5753 – 18 Standard Guide for Planning and Conducting Geotechnical Borehole Geophysical Logging" from ASTM International, UK Specification for Ground Investigation 2nd Edition from ICE Publishing and BS 5930:2015+A1:2020 Code of practice for ground investigations from The British Standards Institution. These standards provide specific guidance for the practice of geophysical logging in a geotechnical environment.

Radioactive sources are used for collecting density and porosity data, vital for hydrogeologists and civil engineers. Due to the sensitive nature of and potentially harmful effects from both gamma rays and neutrons it is necessary to comply with a multitude of nuclear regulations relating to storage, maintenance, operation and road transport from authorities including Public Health England, Natural Resources Wales, Office for Nuclear Regulation, Department of Transport and both police and fire services.

IT Systems, Software and Communications

To successfully control a multifaceted logging operation there is a corresponding need for sophisticated IT systems. Multiple platforms, cloud-based services and remote working capability all put demands on bandwidth in the office, at home and in the field. The software required to make this all run efficiently is provided not only from company wide distributed systems like Office 365 and SAP Business One, but also from in-house developed software and standalone packages for security and internal admin.

The volume of geophysical data and their associated presentations keeps increasing and careful management is required to keep everything organised and backed up.

The advent of smart phones has been a boon to the logging industry allowing peer to peer communications in most locations. These devices now form an integral part of how data is transferred quickly from the field.

People, Training and Internal Standards

Geophysical logging in the field often requires engineers to work long hours in difficult conditions with a high level of responsibility. Staff recruitment takes account of this, whereby engineers are selected for

technical prowess, willingness to learn, hands-on and communication skills and the ability to work well in a team.

In-house training is provided in relation to geophysical principles, specific probes, equipment use and maintenance plus the software necessary to run the systems and process the data. External training is a continuous process that covers such diverse areas as offshore safety, workplace safety, driving, radiation safety and first aid.

Internal standards have been drawn up and are maintained, as requirements change, in order to present clients with a consistency of deliverables.

Probes and Equipment

Robertson Geo manufactures almost all the geophysical equipment that RGS uses which allows for an unparalleled level of backup for the provision of services. This backup includes spare probes, the ability to call off additional equipment from stock and a fast track for repairs. This facility has been key for RGS to almost eliminate down time for clients, due to geophysical problems.

A modern fleet of customised logging vehicles including transit style and 4x4 vehicles, together with portable and offshore configurations means that RGS can undertake depths of borehole to 2000m in almost any environment.

Quality Assurance

Robertson Geo is an accredited ISO9001:2015 company. All business processes are documented, from customer enquiry through contractual agreement, planning and execution to data delivery and billing. Internal and external audits ensure that systems are adhered to and processes are updated where necessary.

All data collected from Robertson Geo probes is backed up by a comprehensive four tier validation system, comprising precision (repeatability), accuracy (calibration), conformance (borehole test) and real-world support. In addition to a conformance guarantee a unique system for full life cycle history for each probe is maintained which includes an audit trail for all data collected, probe/job allocations, maintenance history and calibration dates.

Health and Safety

Constant attention to all health and safety matters is required to ensure that staff work safely. Robertson Geo has its own customised health and safety system which is regularly updated and checked by external auditors. This provides a framework for a modern, inclusive system allowing for feedback and remedial action where required and which meets the requirements of all applicable standards such as the Health and Safety at Work Act 1974.

Training records are kept up to date for each engineer and refresher training is provided at designated routine intervals covering more than twenty specific safety topics. Staff health is continually monitored by providing regular medicals. All engineers carry radiation dosimeters as part of a controlled radiation management programme.

PPE requirements also constantly change over time and the latest equipment is provided for all staff.

Risk Management

Assessment and mitigation of risk now forms an integral part of all logging operations. Wherever possible, risks are eliminated at source and when this is not possible control measures are put in place such as additional training or PPE or by a revision to procedures.

Risk assessments are in place for head office operations, the storage, operation and transport of radioactive sources and most recently for Covid 19.

For every job a specific set of RAMS (risk and method statements) is prepared and sent to the client prior to mobilisation. An on-site point of work risk assessment (POWRA) is also conducted to account for further specific local risks.

Engineers also undertake inductions at all sites so that site specific hazards can be explained, and site rules are understood.

Logistics

Due to the nature of borehole logging, whereby logging often commences as soon as possible after drilling finishes, it is necessary to be able to respond to client needs at short notice. While planning in advance is necessary, all plans are subject to last minute changes in this fast-moving industry.

For land-based jobs the ability to deploy a variety of vehicles and systems to cope with the expected terrain is vital. The extensive use of

mud mats has allowed for larger 2WD vehicles to be deployed which can speed up operations in many cases. For locations inaccessible to vehicles portable or marine equipment can be deployed.

For offshore work, on windfarms for instance, it is often necessary to ship the equipment separately from the engineer. RGS can rely on the expertise of our shipping department who have experience arranging shipments to over 140 countries. Recent restrictions due to Brexit and Covid 19 have served to increase the administrative overhead and travel restrictions and quarantine rules for engineers have to be constantly monitored.

Logging

After dealing with all the above RGS can get to do some logging!

By deploying only two-man crews for all land work (initially as a result of risk assessment) RGS have increased the efficiency of operations to the point where customer satisfaction responses are almost all positive. Simple things like arriving on time, at the right place, with all necessary equipment and spares and working long hours have served to mostly eliminate client downtime attributable to RGS.

RGS engineers are all experienced and fully trained and have the ability to solve problems on site and in the unlikely event that external support is required this is only a mobile phone call away.

All data collected is always QC checked both during logging and by replay at the end of the log to ensure integrity. This is vital if the borehole is to be filled in immediately following logging.

Offshore, RGS usually operate with a single engineer. This is due to the time between logging operations and often from pressure on berth availability on the vessel.

Data

Finally, the most important part, the data. This is what RGS is paid to collect.

For clients everything that goes before is essentially a prelude, providing the work has been planned and conducted safely with efficiency and integrity.

Following the field QC checks the data is ready for processing, usually back at base but sometimes in the field, when offshore for example. Depending on availability, the data will be processed by the engineers or by an RGS geophysicist back at base. In all cases, the processed data will then go through a final QC check by the geophysicist to ensure that it conforms, meets client requirements and is consistent with any previous submissions. Normally data turnaround time is within 24 hours.

For larger, more complex projects a comprehensive final report will be required. The RGS geophysicist will prepare this and it will comprise a factual report and a fully consistent set of data.

For client peace of mind and for our own internal QC analyses, RGS will maintain a copy of all the data in our database in perpetuity.

Graham Comber – Logging Services Manager

References:

D5753 – 18 Standard Guide for Planning and Conducting Geotechnical Borehole Geophysical Logging ©ASTM International.

UK Specification for Ground Investigation 2nd Edition ©ICE Publishing.

BS 5930:2015+A1:2020 Code of practice for ground investigations ©The British Standards Institution 2020.

Televiewer site investigation at **Fujairah** for Stage Two of the **Etihad Rail Project**

STAGE TWO OF the Etihad Rail Project www.etihadrail.ae extends 605 kilometres from Ghuweifat on the border with Saudi Arabia to Fujairah on the UAE's East Coast, to be followed by future route additions.

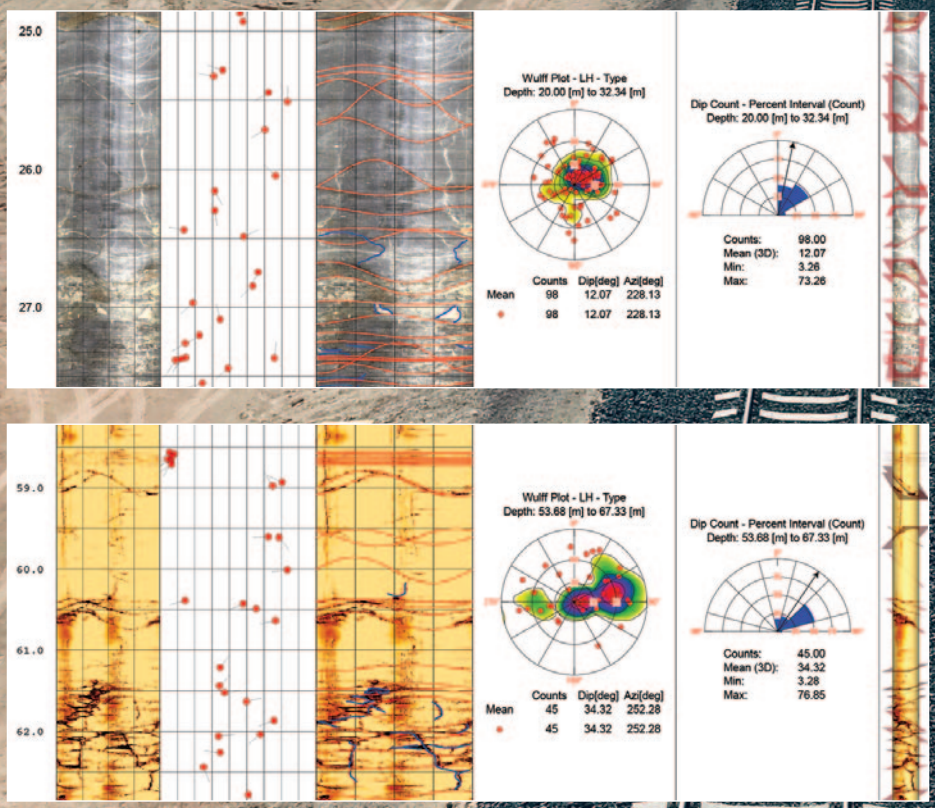
The volume of goods transported on the full Etihad Rail network will increase from the current seven million tonnes per year on Stage One, to more than fifty million tonnes annually.

The network will connect the Emirates via Abu Dhabi, KIZAD, Khalifa Port, Jebel Ali Port, Dubai, Sharjah, Ras al-Khaimah, and Fujairah on the East Coast, linking with the existing line at Ruwais, effectively uniting the major industrial ports and trading centres of the country.

Robertson Geo client - The Arab Centre for Engineering Studies (ACES) www.aces-int.com - commissioned the subsurface investigation of the site located within the emirate of Fujairah. Optical and Acoustic televiewer logging was used to evaluate the geophysical properties of rocks to confirm the information on joints for the slope design of the proposed sites. The High Resolution Optical Televiewer (Hi-OPTV) generates a continuous orientated 360-degree image of the borehole wall using optical imaging to give detailed structural data of fracture detection and evaluation, location, strike, and dip of joints. The High Resolution Acoustic Televiewer (HRAT) provided a continuous orientated 360-degree image using ultrasound transmitting pulses to give detailed orientated structural information.

22 logging tests were successfully completed on the site.

Examples of Optical and Acoustic logging data.

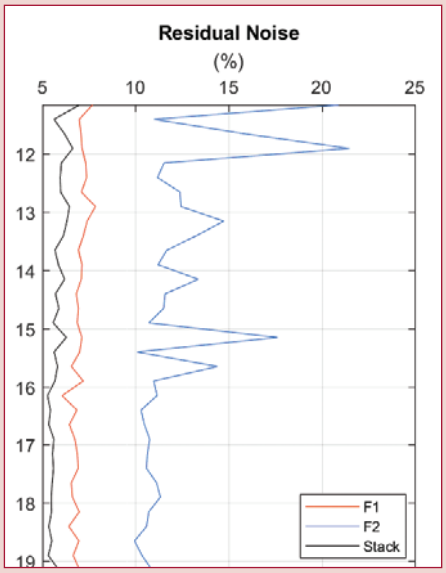


agliard / Shutterstock.com

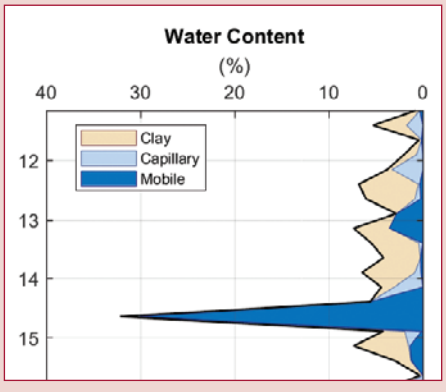
Robertson Geo has been contracted by Structural Soils, under Volker-Wessels to carry out geophysical logging on Phase One of the Kendal Flood Risk Management Scheme.

The Kendal (UK) Flood Prevention Scheme

There are three phases of this scheme for Kendal, Burnside, Staveley and Ings, that in combination will reduce the risk of flooding from a current 20% chance in any one year to just 1% chance in any one year. The expected construction cost of all three phases is approximately £72 million, reducing the risk of flooding to 1,480 homes and 1,100 local businesses across the River Kent catchment and reducing future predicted flood damages by £880 million.



Example of noise levels between the two different frequencies of investigation, with higher noise levels on outer frequency F2.



Example of the mobile water change in a cavity.

THE PROBE SUITE chosen for this project includes the High Resolution Optical Televiewer (Hi-OPTV) and High Resolution Acoustic Televiewer (HRAT), Temperature Conductivity, 3-Armed Caliper, Formation Density, Induction and Resistivity probes, Impeller Flowmeter and Nuclear Magnetic Resonance (NMR) probe.

Work is still ongoing at this site, with a total of six locations having been logged currently, with potentially another 40+ locations remaining.

The geology of the logged area is mainly superficial deposits varying from depths of 4m to 10m, overlying consolidated meta-Mudstone/Sandstone. To gather as much data as possible without the fear of instability and collapse, majority of the locations for logging have consisted of two boreholes drilled within a couple meters of one another.

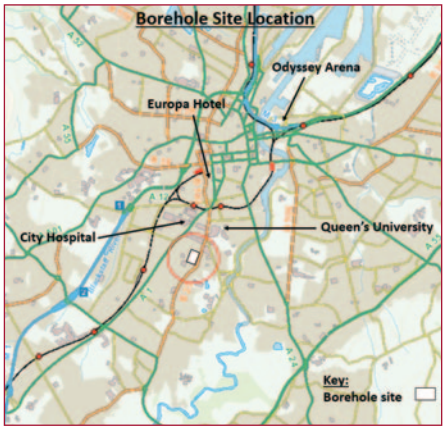
The first borehole is the deeper of the two, with depths varying between 15m to 25m across site. This borehole has 7-inch steel casing in place through the unconsolidated deposits and open hole through the consolidated formation below in which the entire probe suite is run. The second borehole is a shallower PVC cased hole which allows for the Temperature Conductivity probe as well as the NMR probe to gather data through these superficial deposits. A tripod is set up over these PVC holes and the cable run from the sheave over the tripod.

The NMR probe is the Javelin JPY238 probe which is being run as a collaboration between Robertson Geo and Vista Clara Inc. This tool provides water content dispersal (clay, capillary and mobile), hydraulic conductivity and transmissivity from two frequencies. These multiple frequencies provide data from different depths of investigation which ultimately eliminate effects from washout and drilling disturbances. These frequencies also allow useable data to be collected in suboptimal conditions where there may be higher levels of noise disturbance influencing the tool.

Where instability has been an issue on site, the data from the suite of probes above has been collected over a series of runs/casing pulls. In this instance the NMR is able to run through Geobor S casing with ease and does not appear to be limited by the depth/length of this casing.

Aquifer Thermal Energy Storage (ATES) systems are becoming increasingly popular across Europe in response to the Global effort to transition from fossil fuel energy sources to low carbon renewable energy sources.

The Impact of **Thermal Plumes** on **Aquifer Properties** and **Ground Water Quality**



ATES TECHNOLOGY HAS yet to be successfully introduced to the UK and Ireland, but there are multiple geological opportunities for harmonisation into our energy supply matrix.

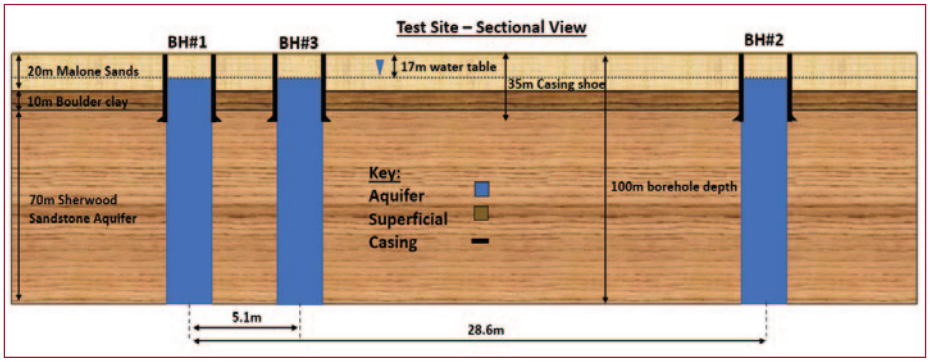
The Sherwood Sandstone aquifer presents a suitable opportunity in the Belfast area to introduce ATES. However, this aquifer is also used for potable water supplies in the Belfast area, so the impacts of ATES require investigation.

The thermal plumes discharged into the "warm well" of an ATES system are not only likely to reduce aquifer porosities & permeabilities by facilitating inorganic precipitation and secondary mineralisation but also by promoting microbial activity within the aquifer, with the additional biomass adding to the reduction of aquifer porosities. This in turn may affect the overall efficiency and sustainability of the duplet Geothermal installation and reduce the sustainable yield of the groundwater body for water supplies. The influence of thermal plume temperature ranges on sustainability requires investigation and modelling.

This research study combines the baseline characterisation of the aquifer system by completing a series of active well geophysical measurements, hydraulic tests, hydro chemical sampling and microbial profiling with the long-term monitoring of experimental thermal injection tests at varying temperatures.

Queens University has a suite of Robertson Geo geophysical probes and surface equipment. Geophysical data from wireline logging is supporting the research with data acquisition using Temp/Conductivity, Caliper, Gamma/Resistivity and Acoustic Televiewer tools.

Hydro-chemical and microbial sampling & analysis is supplementing down hole temperature monitoring using multi-mode fibre optical cable as part of a distributed temperature sensing system and bio geophysical monitoring of microbial activity using borehole magnetic resonance logging. Collected monitoring data is integrated into heat transport models using FeFlow and LeapFrog to evaluate field-scale thermal properties of the aquifer and to better understand the impact of thermal plumes on aquifer properties.



UNIVERSITY OF ABERDEEN | QUEEN'S UNIVERSITY BELFAST

QUADRAT Doctoral Training Programme PhD Student:
Joseph Ireland

Supervisors:
Dr. Ulrich Ofterdinger *and* Professor John Barry

SNBE and HAPP, Queen's University, Stranmillis Road, Belfast, BT9 5AG

Loggers Journal

Here there and everywhere... the life of a Robertson Geo Logging Engineer

VOLCANO
WHAT VOLCANO?

IT HAD BEEN a long 10 weeks offshore on the other side of the world and I was completely set on returning home to my family. Then suddenly there was a breaking news story about Eyjafjallajökull Volcano eruption in Iceland and my dreams of returning home were up in smoke, quite literally!

The job was in north-west Australia, working offshore out of the port of Dampier. Robertson Geo was sub-contracted by Gardline for a project for Chevron which included PS Logging on 200m boreholes. I was relatively new to the job and was keen to work in Australia. Unfortunately I did not get to experience 'working' for the entire 10 weeks. As the boreholes were 200m in depth the drilling team would need 5-6 days to be able to drill the holes. Weather and sea conditions wouldn't allow us a window long enough to complete these boreholes, so I didn't get to deploy the PS Logger® and the closest I got was weekly checks that the probe was ready for when called upon. I remember a lot of people were jealous that I went away to work for 10 weeks but I didn't actually do any work. I said at the time it was not as good as it seemed and the sitting round not doing much made the time away a lot worse, I might add we are usually so busy the time flies by and then we can complain as Engineers do of having too much to do.

So, after the long periods of boredom, I was in my last week and ready to come home. The news then came through how this volcano in Iceland had managed to ground all flights in Europe! I was starting to worry as my replacement was due to fly out in 4 days' time. Without him arriving I would have to stay on board, and it would be for another 4-6 weeks! My life resorted to checking updates every five minutes. Worrying that if flights do get up and running again, will the cancelled flights get priority, and will my replacement get his flight anyway?

Luckily, they made the decision to allow flights again and he was on one of the first flights back in the air! All was good again and I could think about getting home.

Ian Jones, Logging Operations Supervisor.

Not New York today... you're in Doncaster instead

HERE AT ROBERTSON Geo, not only do we design and manufacture Logging probes, we have a Logging services department ready to deploy to anywhere in the world at a moment's notice.

James Boyett
Logging Engineer

As a Logging Engineer this can sometimes be a double-edged sword - in the eighteen months I have been in the department I have travelled the length and breadth of the UK, flown halfway round the world to spend a couple of weeks offshore Taiwan and a couple of short stints in Holland and the South of France. The sense of adventure is one aspect I thoroughly enjoy with this role. On the other hand, as we are required to be on-site as soon as borehole drilling is finished, mobilisation can be very unpredictable due to many reasons including and not limited to, drill downtime or borehole collapse.

One case in point, in one Friday lunchtime staff meeting an email came through from a client requesting a full offshore logging setup including a 2,000m winch, full surface system and PS Loggers be shipped that day to New York.

With minutes to spare we managed to get the equipment together, tested and packaged safely for the courier to collect for the shipment to the States. Being the only Engineer around at the time with a valid US visa for transit to a vessel, it was down to me.

My next adventure was due to begin on the Monday! With a mix of nerves (hoping everything would go smoothly) and excitement, over the weekend I told my family where I would be working. Monday morning comes around, bag packed and ready to go when an email comes through: "Project cancelled due to borehole instability".

I ended up on a one-day job up the road in Doncaster that day!

Won't be home for tea - I'm off to Indonesia

LIFE AS A Logging Engineer is a varied life at times. One day you could be in a field on a simple logging job, next you could be jetting off to some exotic location on a commissioning visit.

Ralph Whiteley
Logging Engineer

I started off with Robertson Geo as an Electronics Technician. Which means I have experience especially with equipment maintenance. I recently went out to Indonesia to commission tools on-site, which turned out to be quite a trip!

Firstly, the plane from Manchester had developed some sort of fault which caused a delay and me missing the connecting flight to Indonesia. But I did get to spend the night in Qatar in a very nice hotel which was provided by the airline.

The final leg of my journey was to be by seaplane as the location was on a remote island with no airstrip. I have never travelled by sea plane before, and it was an experience I'll never forget.

When we got to the Island, I was expecting a five-hour jeep ride through the jungle to get to the camp where the equipment was. However, they decided to fly me out by chopper instead to save time.

When I was originally told that I would be staying at a camp site in the middle of a jungle I was kind of apprehensive. But when I arrived, it was well appointed and in a location which offered all round wonderful views - quite an experience!

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