

OGIC Project Case Study: Volcanic Basin Petroleum Research UK with University of Aberdeen

Applying Resonance Enhanced Drilling to coring

Volcanic Basin Petroleum Research UK (VBPR) specialise in research and consultancy in volcanic basins and associated petroleum prospectivity challenges.

A fundamental element in prospecting is coring. The key reason for coring is to attain representative intact rock samples which can be analysed to give insights into reservoir properties. These properties including porosity; permeability; saturation and rock strength, comprise critical information that is fed into the appraisal of hydrocarbon accumulations and contributes to predictions of in-place reserves, productivity and field life. However, coring is expensive, due to the need to pull out the entire drill string to change the bit at the start and end of coring; the short run intervals; the slower rate-of-penetration (ROP) than conventional bits and the core retrieval process.

VBPR approached OGIC to support a proof of concept project to identify if resonance enhanced drilling (RED) could be used for coring. The potential identified by VBPR was to lead the way for a tool development which could make significant improvements to core recovery, coring operations costs and formation evaluation, ultimately reducing costs and potentially adding value. OGIC supported VBPR's project with the RED team from the University of Aberdeen.

The project had three principle goals:

1. Test whether RED technology could be used effectively with a coring bit.
2. Attain equal or improved core quality for the homogeneous test rocks.
3. Improve ROP of core cutting without sacrificing quality.

Proof of concept was achieved using conventional coring bits and proved RED can work for coring. RED improved ROP by up to 50%, which could significantly speed up the coring process. The research demonstrated no negative effects, no fracturing and that the cores were of good quality.

The next stage for this project will be to initiate a development project to bring the coring technology to market.

“It has been a real pleasure to collaborate with the UoA School of Engineering on this project. The results are very positive and form a strong foundation from which to make potentially major steps forward in future coring capabilities, reducing costs and improving recovery. The project has special relevance for hard-rock coring scenarios such as through volcanic sequences and may help answer questions resulting from limited or poor core recovery in such scenarios.”

Dr John Millett, Director
VBPR UK Ltd

“These promising results were obtained for standard coring tools and they can be significantly improved by drilling with custom designed coring bits. This has been one of the most successful short projects with industry the Centre for Applied Dynamics Research (CADR) has been involved with. The obtained results are not only academically new but also of a direct practical relevance, which opens another window of opportunity to commercialise the RED technology.”

Professor Marian Wiercigroch, CADR,
School of Engineering, University of Aberdeen