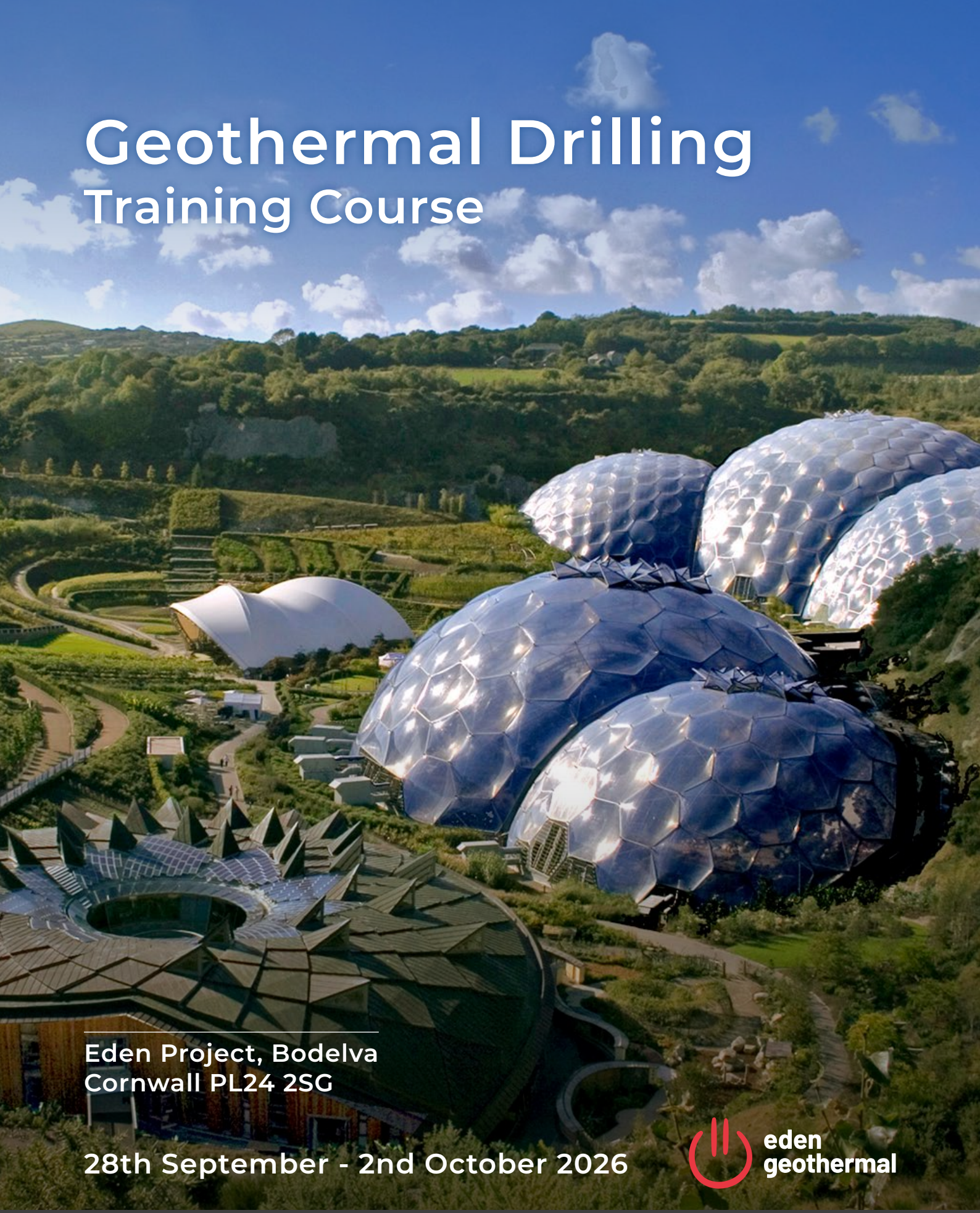
Geothermal Drilling
Training Course



Eden Project, Bodelva
Cornwall PL24 2SG

28th September - 2nd October 2026

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BLACK REIVER CONSULTING EURL

IADC MEMBER

Black Reiver Consulting EURL
16, Rue Anatole France, Quillan 11500, France

Course Overview

The course will introduce the key technologies and engineering strategies required to plan and execute a successful geothermal project. It focuses on drilling technology, equipment and principles used in successful geothermal wells. Specific attention is given to metallurgy and well control issues for geothermal wells. Throughout the whole course, the critical areas of difference of geothermal drilling to conventional O&G well drilling will be highlighted. Overall, the course provides a holistic perspective to geothermal drilling from a point of view of geothermal developer.

Key benefits

By the end of the course, participants will have a better understanding of:

- The key technologies and engineering strategies required to design and successfully execute geothermal projects
- The different types of geothermal development and how project type, depth, temperature and technology influence technical risk, environmental considerations and the appropriate level of regulatory and planning oversight
- The metallurgy, well integrity and well control considerations specific to geothermal wells
- The relationship between geothermal drilling and established oil and gas drilling technologies, including where practices can be transferred and where geothermal requires a different approach
- The specialist tools, equipment and drilling techniques required for efficient geothermal well construction
- The specific drilling and subsurface challenges associated with geothermal developments
- How technical well design and drilling decisions can influence surface impact, environmental risk, induced seismicity, water management and long-term project performance
- How regulators, local authorities, planning bodies and other stakeholders can better distinguish between different geothermal project types and their associated risk profiles
- The technical information required to support informed discussions between developers, regulators, local government, communities and other stakeholders

Who should attend

- Geothermal developers and operators
- Oil and gas companies venturing into or already active in geothermal drilling, including:
  - Drilling engineers
  - Well site supervisors
  - Rig managers
  - Geoscientists and reservoir engineers seeking to better understand their interaction with drilling and well construction teams
- Geothermal drilling and engineering companies, contractors and service companies
- Local government and planning authorities involved in assessing or supporting geothermal developments
- Regulators and public-sector organisations responsible for energy, subsurface resources, environment, water, planning or infrastructure
- Environmental organisations and NGOs seeking a stronger technical understanding of geothermal development, its potential impacts and the engineering measures used to manage them
- Energy generation, utilities and energy management organisations
- Civil engineering and infrastructure organisations
- Investors, venture capital and project finance organisations seeking to better understand geothermal technology, project risk and development requirements
- Community and regional development organisations involved in local energy and decarbonisation initiatives

The course will be delivered at the 'Room with a View', the UK's only deep geothermally heated commercial greenhouse and events space.

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More Than a Training Course

The programme combines world-class technical training with exclusive access to one of the UK's flagship geothermal developments.

Delegates will enjoy:

- Internationally recognised geothermal drilling training delivered by Black Reiver Consulting, combining practical drilling and well engineering expertise with a broader understanding of the technical, regulatory, planning and stakeholder considerations surrounding geothermal development.
- A hosted networking dinner on Wednesday evening within one of the spectacular Eden Project Biomes, providing an informal opportunity to meet and exchange ideas with fellow delegates, industry specialists and members of the Eden Geothermal team.
- A guided tour of the Eden Project, including exclusive access to the Eden Geothermal well site, providing first-hand insight into the development, drilling and delivery of one of the UK's most significant geothermal projects.
- An informal "Quiz the Experts" session on Thursday evening, giving delegates the opportunity to discuss real-world geothermal challenges over a drink with Kevin Gray, Tony Pink and members of the Eden Geothermal team.

Eden Geothermal Industry Sponsorship

To support the development of technical competency across the UK geothermal sector, Eden Geothermal has sponsored a limited number of places for delegates from the public sector and non-governmental organisations (NGOs).

Commercial delegate fee: £2,650 + VAT

Sponsored public sector & NGO delegate fee: £1,475 + VAT

The sponsored programme is identical in content, duration and certification to the full commercial course.

Sponsored places are limited and will be allocated on a first-come, first-served basis.

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"I found the training very well prepared and well understandable. This is a complex topic, but with the presenter and the content of the training, I have learned a lot, actually more than I thought I could. Kevin was very professional and still casual. Great presenter with deep knowledge of the topic, yet still open for discussion."

Michal Masek, Project Manager, PW Energy, Slovakia

Your Expert Trainer

Kevin Gray, Black Reiver Consulting UK

With more than 36 years of drilling experience and over 5,000 days of rig-site operations worldwide, Kevin Gray is recognised internationally for his leadership in geothermal drilling, drilling competency and industry standards. His career combines extensive operational experience with the development of industry standards, competency frameworks and advanced technical training that are helping shape the next generation of geothermal professionals.

Kevin is a lead contributor to the IADC Geothermal Well Control Guidelines and a founding member of the IADC Geothermal Committee Steering Group. He was the proposer and originator of the IADC Geothermal Well Classification System, now the industry's standard framework for describing geothermal well types, and was one of the driving forces behind establishing the IADC Geothermal Drilling Conference. He was also a founding member of the UK All-Party Parliamentary Group (APPG) on Deep Geothermal.

A passionate advocate for raising technical competency across the geothermal sector, Kevin has become one of its leading voices on drilling education, operational excellence, well control and workforce development. Through international training programmes, conference presentations and collaboration with operators, regulators and industry bodies, he is helping establish a consistent, competency-based approach to geothermal drilling.

Kevin has advised multiple regulators internationally on the development of geothermal drilling and well construction regulatory frameworks. His expertise spans drilling practices, competency, well control, well integrity, induced seismicity and proportionate regulation, with a number of his recommendations subsequently adopted by regulatory authorities.

He is also a prolific technical author whose widely read articles examine both the opportunities and challenges facing geothermal development. His work covers subjects ranging from the operational realities behind the Dutch geothermal doublet heat story to induced seismicity, well control, drilling performance, emerging technologies and regulatory frameworks. His evidence-based analysis is recognised for challenging accepted narratives while proposing practical solutions for the safe and commercial development of geothermal energy.

Through Black Reiver Consulting, Kevin advises operators, developers, investors and technology companies on drilling strategy, technical due diligence, asset evaluation, well design, drilling optimisation and competency development, helping bridge the gap between innovative concepts and successful field deployment.

Before specialising in geothermal, Kevin was one of Schlumberger NExT's highest-rated instructors and lead trainer within the award-winning Merlin Extended Reach Drilling team. He authored Schlumberger's first global SOP for Directional Drilling Support Centres, developed human dynamics training for real-time operations teams, led development of the first multi-axis real-time vibration monitoring system and contributed to the redesign of the PowerDrive X5 RSS tool.

EGEC GEOTHERMAL

Geothermal Drilling Consultant

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Tony Pink,
CTO of Eden Geothermal
and Blackreiver instructor

Tony graduated with a BSC in Geology from University College of Wales Aberystwyth in 1990 and has a postgraduate diploma (GMP) from Harvard Business School. He spent 5 years in the field as an MWD/LWD Engineer followed by 5 years as a Directional driller. He moved into management with Schlumberger in 2000 and worked in several posts including Drilling Training Manager and the Engineering Manager for US Land.

In June of 2011 Tony became the VP of Automated Drilling Applications with the objective of delivering an automated drilling solution for NOV and our industry. In 2014 He became the VP of services for a new division of NOV called Dynamic Drilling Solutions and is responsible for delivering Automated Drilling Solutions to NOV's customers. He has also been an active member of Geothermal Rising, the Society of Petroleum Engineers (SPE) Geothermal Technical Section (GTTS) including the role of vice chairman.

In October 2018 he became the CTO for NOV, Wellbore Technologies. In October 2023 Tony started a UK registered company "Pink Granite Consulting" and joined Blackreiver. PGC provide consultancy services in drilling, drilling technology and drilling optimisation to the Geothermal industry. In June 2024 Tony was appointed as the Task Force Chairman for Drilling for the DOE, GEODE project. He is currently a Technical advisor for Mazama Energy in the US and the CTO of Eden Geothermal in UK

He has published and presented 13 SPE/IADC papers and has 5 US and EU Patents on Closed Loop Drilling Automation, Automated Directional Drilling, Early Kick Detection Particle Drilling and Insulated Drill Pipe. Most recently he presented a paper commissioned by CATF at the Iceland Geothermal Conference (IGC) Title "Technology Gap Analysis for Super Hot Rock Drilling". This was also presented at Stanford in 2025.

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"I was looking to participate in a training where we could compare oil and gas versus geothermal. Geothermal Drilling course provided exactly this; now I have a better understanding of the geothermal world and how important is the experience from the oil and gas industry for this type of projects. Kevin did a great job sharing his knowledge!"

Anna Ortin, Geological Operations Advisor, Repsol, Canada

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Day 1
28 September 2026, 1pm

13:00: Welcoming note and opening remarks

13:15: MODULE 1: Introduction to geothermal wells

- Geothermal definitions, resource types and well classifications
- Origin of geothermal heat and the principal methods of geothermal exploitation
- How geothermal project type, depth, temperature and intended use influence development complexity, risk and potential impact
- Key differences between geothermal and conventional oilfield wells
- The geothermal drilling performance gap and its implications for project cost and viability
- Key aspects of geothermal well design and construction
- Critical well engineering considerations including temperature, geology, fluids, well integrity and well control
- Understanding how different geothermal technologies and well types can require different levels of regulatory, planning and environmental oversight
- The importance of proportionate, risk-based assessment rather than treating all geothermal developments as equivalent
- Defining the technical and commercial value of a geothermal resource and its potential contribution to local heat, power and energy security

15:30: Afternoon refreshments and networking

15:45: MODULE 2: Basics of Rotary Drilling

- Rig types, equipment and the scale of drilling operations associated with different geothermal well types
- Rig personnel, responsibilities and operational roles
- Rig specification and defining the capabilities required for geothermal projects
- Understanding the surface footprint, site layout and infrastructure requirements of a geothermal drilling operation
- Key rig equipment for high-temperature geothermal operations
- Rig power, hoisting, circulating, rotating, well control and solids-handling systems
- Drilling fluid handling and containment systems for high-temperature fluids
- Fluid cooling systems and management of heat at surface
- Practical considerations including noise, lighting, traffic, emissions, water use, waste and 24-hour operations
- How rig selection, well design and drilling technology can influence the duration, environmental impact and local disruption associated with well construction
- Understanding the difference between the temporary impacts of drilling and the considerably smaller long-term footprint of an operating geothermal development

17:30: End of day one

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Day 2
29 September 2026

10:00: MODULE 3: Downhole Tools and Equipment

- Types of bottom hole assembly (BHA) and their application in geothermal wells
- Mud motor and turbine technology
- Measurement While Drilling (MWD), directional drilling and formation evaluation technologies
- BHA components, stabilisers, drill collars and specialist downhole tools
- Drill bit types and selection for different geothermal formations
- Influence of temperature on downhole tool performance, reliability and suitability
- How downhole technology enables well trajectory control, geological understanding and more accurate targeting of geothermal resources
- The role of directional drilling in reducing surface footprint and enabling multiple subsurface targets to be accessed from a single drilling location
- How appropriate tool and technology selection can improve drilling performance, reduce well construction time and limit surface disruption and environmental impact
- Understanding the technical limitations and uncertainties of downhole measurements in high-temperature geothermal environments

11:30: Morning coffee and networking

11:45: MODULE 4: Directional Drilling

- How geothermal wellbores are steered and positioned in the subsurface
- How increasing temperature affects directional drilling technology and can limit well positioning options
- Rotary BHA design for build, drop and hold applications
- Designing and using steerable rotary assemblies and rotary steerable systems
- How directional drilling allows subsurface targets to be reached from alternative surface locations, providing greater flexibility in site selection and planning
- Using directional wells to reduce surface footprint and enable multiple wells or targets to be accessed from a single well site
- The relationship between well trajectory, geology, geothermal resource targeting and drilling risk
- How well positioning can help manage environmental, land-use and surface constraints, including sensitive or restricted areas
- Understanding the difference between the surface location of a geothermal development and the subsurface area that can potentially be accessed

13:15: Luncheon

14:15: MODULE 5: Wellbore surveying

- Understanding the wellbore survey
- Uncertainty and well positioning
- Types of survey
- Survey corrections
- Well collision avoidance
- Well intersection in injection production loop type geothermal wells
- Understanding error models
- Survey accuracy
- Survey corrections

15:30: Afternoon refreshments and networking

15:45: MODULE 6: Tubular design

- OCTG tubulars and casing design for HPHT wells
- Understanding tubular manufacturing for OCTG products
- Casing and tubing specification and standards
- Casing sizes and weights
- The design limitations of tension, compression, burst, collapse, and torsion for casing
- Casing seat selection
- Casing running and setting
- Wellhead components

17:30: End of day two

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Day 3
30 September 2026

10:00: MODULE 7: Latest technology for drilling, completing, and stimulating reservoir independent geothermal wells

- Rig design specifics for geothermal
- ROP Creation and drilling optimisation
- Temperature management
- Latest cement technology
- Casing design
- Completion design
- Responsible and optimised stimulation

11:30: Morning coffee and networking

11:45: MODULE 8: Basic well control for geothermal wells

- Principles of hydrostatic pressure in the formation and origin of over pressure
- The blow out preventer and associated equipment
- The principle of double barrier operation
- Well integrity and barrier envelopes
- Well kicks
- Conventional overbalance drilling
- Well control operations

13:15: Luncheon

14:15: MODULE 9: Drill bit design and selection for geothermal and hard rock

- Understanding basic drill bit types
- Design features of drill bits
- Drive systems and drill bit choice
- The importance of wear grading
- New technologies for drill bits
- PDC cutter design
- PDC optimisation in basement rock
- Aspects of PDC cutter damage during drilling

15:30: Afternoon refreshments and networking

15:45: MODULE 10: Drilling problems

- Stuck pipe and fishing
- Hole cleaning
- Types of stuck pipe
- Planning to avoid stuck pipe
- Torque and drag in directional wells
- Stuck pipe indications and freeing
- Fishing and well recovery operations

17:30: Eden Project Tour

1900: Networking Dinner

Following the end of the taught course on Wednesday, delegates will have a guided tour of the Eden Project, This will be followed from 7.00pm by a networking dinner.

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Day 4
1 October 2026

10:00: MODULE 11: Shock and vibration of drilling assemblies

- Types of shock and vibration
- Origins of S&V
- Designing BHA to reduce S&V impacts
- Tool damage
- Well bore issue with S&V in drilling assemblies
- Axial vibration
- Lateral vibration and torsional vibrations
- Measurement and identification of S&V

11:30: Morning coffee and networking

11:45: MODULE 12: Drilling Fluids, Water and Environmental Management

- Types of drilling fluids used in geothermal well construction
- Basic drilling fluid properties and their role in safe and efficient drilling
- Measurement and monitoring of drilling fluid properties
- Effects of high temperature on drilling fluid behaviour and performance
- Lost circulation in geothermal formations and methods of loss prevention and control
- Understanding where drilling fluids go during normal operations and during losses to the formation
- HSE considerations associated with high-temperature drilling fluids and returns
- Water sourcing, consumption, storage and recycling during geothermal drilling operations
- Surface containment, treatment and responsible management of drilling fluids and produced returns
- Managing potential groundwater and surface-water interaction risks through appropriate well design, fluid selection and operational controls
- Selection of drilling fluids to minimise environmental impact and disposal requirements
- Understanding the difference between temporary water and fluid requirements during drilling and those associated with long-term geothermal operation
- How effective fluid and water management supports environmental permitting, regulatory compliance and responsible project development

13:15: Luncheon

14:15: MODULE 13: Geomechanics of geothermal wells

- Understanding far field rock stresses
- Hoop Stress and its role in wellbore strengthening
- Thermal Stress
- Hydraulic and Thermal Fracturing
- The importance of ELOT/XLOT

15:30: Afternoon refreshments and networking

13:45: MODULE 14: Formation damage while drilling

- What is formation damage (skin factor)
- Impacts of reduced permeability on production value
- Strategies to reduce formation damage
- Aspects of drilling leading to skin formation

17:30: Quiz the Experts

After the formal course teaching finishes on Thursday evening, we will hold an informal “Quiz the Experts” session over a drink, hosted by Kevin Gray, Tony Pink and members of the Eden Geothermal team. This will give delegates the opportunity to raise questions, discuss real-world geothermal drilling challenges and explore topics beyond the formal course programme.

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Day 5
2 October 2026

10:00: MODULE 15: Open Discussion – Legislative, Regulatory and Planning Environments

An open, facilitated discussion bringing together the technical, regulatory, planning and stakeholder perspectives explored throughout the course.

- Current UK and European legislative and regulatory environments for geothermal development
- The roles of national regulators, local authorities and planning bodies
- How regulatory and planning requirements should reflect project type, depth, technology and actual risk
- Developing a proportionate, risk-based approach to geothermal regulation and permitting
- Environmental permitting, water, induced seismicity and other areas of regulatory concern
- Planning considerations including site footprint, traffic, noise, visual impact and operating hours
- Public perception, community engagement and the causes of objections or refusal
- The perspectives of local government, regulators, developers, NGOs and communities
- How technical evidence can be better communicated to support informed planning and regulatory decisions
- What currently works, what does not, and what could be improved to enable responsible geothermal development

11:30: Morning coffee and networking

12:30: Certificates

13:00: End of course

"Thanks to Kevin and the Geothermal Wells training course, I not only have a newfound appreciation for geothermal energy, but also a solid understanding of how it works. I highly recommend this course to anyone who wants to learn about renewable energy in an engaging way."

Zoltan Namesanszky, Senior Completion Engineer, MOL Group, Hungary

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