TETRA TECH RPS ENERGY | TRAINING

N580: Exploration and Development of Deep Aquifer Geothermal for Direct Heat Use

Instructor(s): Mark Ireland

Format and Duration

Classroom - 3 Days
Virtual - 5 Sessions

Summary

The course will cover the utilisation of geothermal heat, the principles of the exploration of geothermal resources, and the fundamentals of developing this resource. Through paired classroom exercises, participants will deepen their appreciation of the impact of reservoir heterogeneity and complexity on development scenarios, the development options, decisions for direct use heat resources, and evaluate the key project risks and uncertainties.

Business impact: Direct use geothermal has the potential to make a significant contribution to the decarbonisation of heating and cooling. For geothermal to become a more widely used sustainable resource will require an acute awareness of the uncertainties and risks associated with the exploration and exploitation of them. Participants will gain an appreciation of the entire lifecycle of developing direct use geothermal resources.

Learning Outcomes

Participants will learn to:

1. Summarise the principles of the decarbonisation of heating and the options available.
2. Establish the importance of characterising the reservoir from which heat is being extracted.
3. Appreciate subsurface hydrological regimes and their role in geothermal energy resources.
4. Understand the processes of well planning in development of a resource.
5. Know how well tests are carried out and the basics of interpreting well test data.
6. Compare different geothermal development options.
7. Detail the principal risks associated with geothermal projects.

Training Method

A classroom or virtual course comprising 5 half-day sessions. Practical exercises and scenarios form a key part of the course.

Who Should Attend

This course is primarily designed for geoscientists and engineers who can draw on experience of subsurface geoscience and engineering from the hydrocarbon industry but is suitable for anyone with a geoscience or engineering background.

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Course Content

Topics

- Decarbonising Heat
  - Need to decarbonise heating
  - Utilisation of low enthalpy resources
  - Heat Network Basics
- Exploration and Resource Principles
  - Geothermal plays
  - Aquifer controls
  - Reservoir characterisation
- Subsurface and Development Uncertainties
  - Well/Flow Rate Basics
  - Fluid Characterisation and Scaling
- Drilling Fundamentals
  - Well design
  - Completion
- Reservoir Quality
  - Fracture vs matrix flow
  - Impact of hydrological regime
  - Aquifer boundaries
- Well Rates and Testing
  - Well spacing
  - Impact of reservoir heterogeneity on flow
  - Types of well test
  - Basic well test analysis
- Geothermal Development Options
  - Evaluate Case studies
  - Comparison of different development options
- Demand-Led Exploration Exercise
  - Integrated Exploration Exercise
  - Project Risks