



INTEGRATED TECHNOLOGIES MWD/LWD Forum

Keeping Your Finger On The Pulse



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Next-Generation Active Magnetic Ranging

Field Results from Geothermal and Relief Well Applications

Speaker Information

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- Downhole Product Line Manager
- September 18th, 2025
- Erdos Miller



ERDOSMILLER

In partnership with:



Introduction

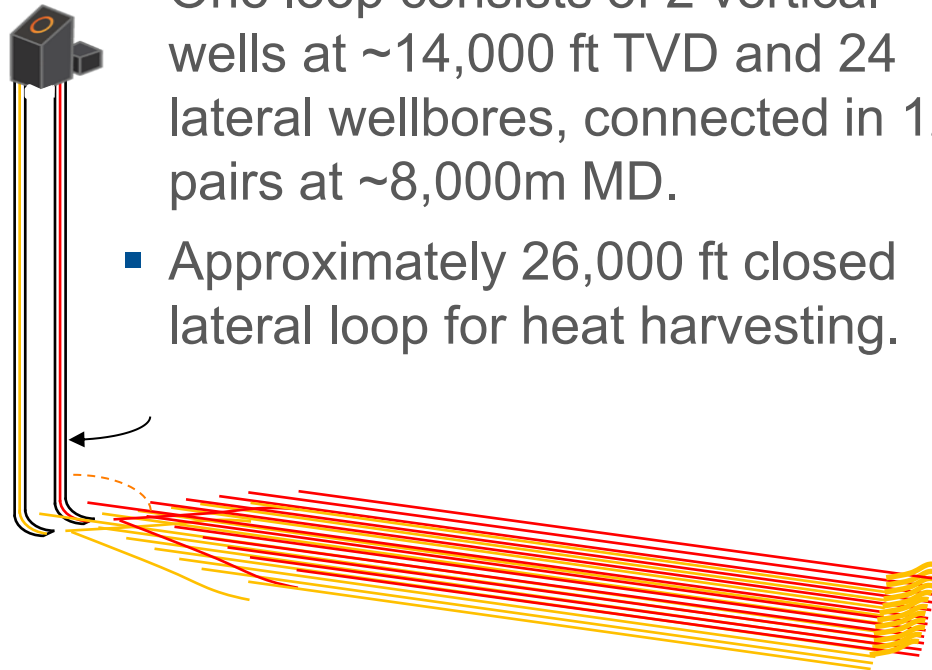
- What is magnetic ranging used for?
 - Relief wells
 - SAGD (Steam Assisted Gravity Drain)
 - Advanced geothermal systems
 - Collision avoidance ... and more
- Discuss two case studies
 - Closed loop geothermal with rotating magnet ranging
 - Access independent active magnetic ranging

Challenges with Wireline Ranging

- Open hole wireline ranging runs take time... a lot of time (and \$\$\$)
 - Each round trip ~24-48 hours
- Open hole wireline is risky from a safety perspective
 - Hole stability
 - Risk of getting stuck
 - Well control / swabbing
- **Solution: Ranging While Drilling**



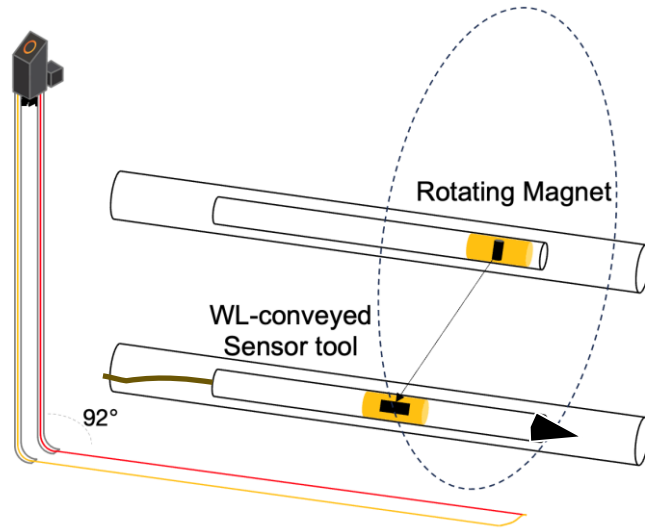
Rotating Magnet AMR While Drilling



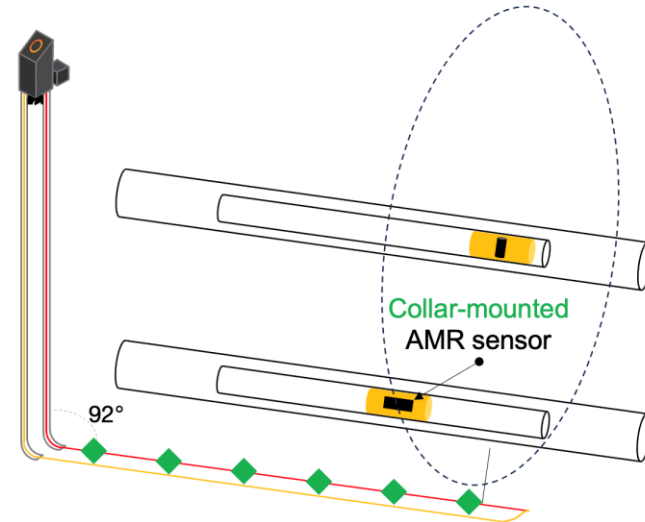
Geothermal project in partnership with Eavor

Wireline vs While Drilling

Wireline Ranging

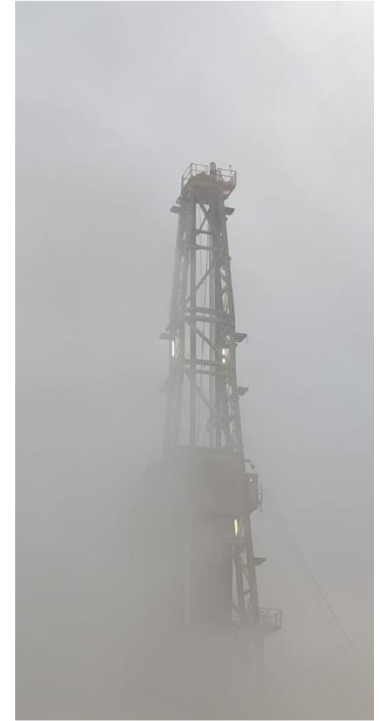


Ranging While Drilling



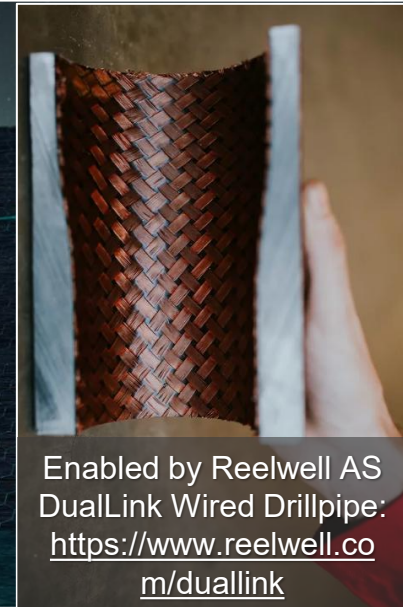
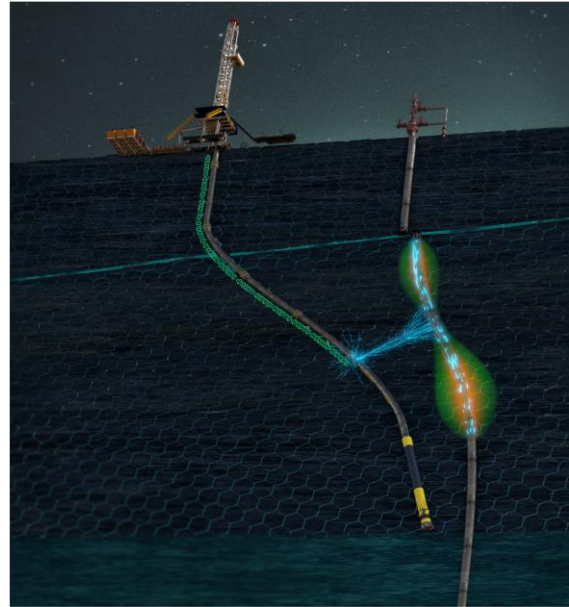
Successful Intercept

- 1st attempt intersection of two lateral wells at 25,606 ft MD
- Instantaneous hydraulic communication between two wells
- Hot fluid circulation due to a thermosyphon effect



Access-Independent AMR/PMR/GWD System

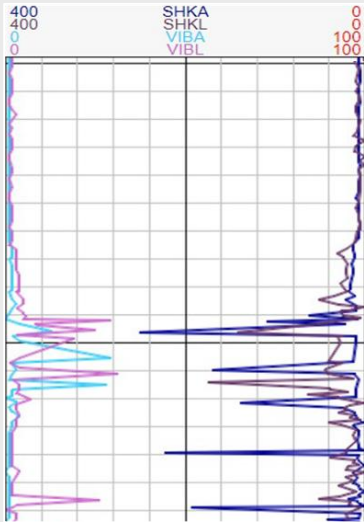
- Depth of investigation (range) of wireline AMR systems is limited by power injected into the formation
- Wired pipe enables:
 - 20x increase in power delivery
 - Elimination of wireline runs and BHA trips
 - Modelled depth of investigation (range) is up to 100–150m
 - Expected to work in salt
 - Patent # US 11,781,421 B2
 - First field deployment completed in Q1 2025 (Western Australia land)



Enabled by Reelwell AS
DualLink Wired Drillpipe:
<https://www.reelwell.com/duallink>

Access-Independent AMR While Drilling – Intercept

High shock/vibe while milling



Metal shavings in the returns



Metal buildup on string magnets



Mill wear profile

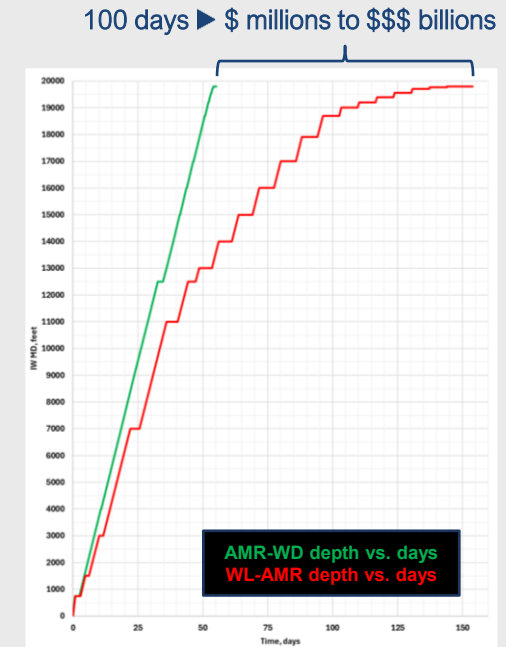


AMR-WD Summary of Results

- Successful first field deployment of the Access-Independent Gradient AMR While Drilling system
- Target intercepted in record time
 - 60m SHL offset between target and intercept wells
 - 2000m TVD at the intercept
 - Only 5 wireline AMR runs were performed, with the 5th run to confirm contact before milling
 - Just 8 days between the first and last ranging runs
- Successful abandonment approved by the regulator
- Significant time and cost savings for the client: abandonment completed below AFE

Our Mission: Zero Wireline Runs

- Complete elimination of wireline ranging runs
 - No BHA/pipe trips
 - No exposed open hole risk
 - Safer and faster
- **Example:** 3x faster intercept
 - 20,000ft intercept MD
 - Wireline AMR
 - 20 wireline AMR runs
 - 155 days to intercept
 - AMR While Drilling:
 - 55 days to intercept
 - \$ Tens of millions saved on Complex P&A
 - \$\$\$ Billions saved on Major Blowout with daily fines



Conclusion

- Goal: The complete elimination of wireline runs for ranging
- As single shot went to MWD, so must wireline ranging go to Ranging While Drilling
- Why? For the stakeholders:
 - Regulators
 - Operating companies
 - The public and the environment (the consideration of upmost importance!)



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Thank You