DeepU

DELIVERABLE D8.1

Report on the required return gas flow conditions for DeepU drill strings and drill head based on the experimental dataset collected.

Lead Beneficiary: Wrocław University of Science and Technology (WUST)

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PUBLISHABLE SUMMARY

The study showed that cold supercritical nitrogen can be efficiently used as flushing medium in deep geothermal drilling. Particle shape and size are key factors in rock debris pneumatic transport, with smaller and flatter particles being removed more efficiently. Deep boreholes require higher nitrogen mass flow rates and pose challenges such as high outlet velocities and temperatures, which must be considered in drill string design. While the current design already meets project goals, further optimization is needed, especially regarding heat management and lens laser absorption. The developed mathematical model was experimentally validated and proved reliable, with future work focusing on controlled nitrogen flow experiments.