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Experimental Studies of Supercritical Fluid-Rock Interactions Geothermal: The Next Generation

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The *Geothermal: The Next Generation (GNG)* Endeavour programme is investigating New Zealand's supercritical geothermal resource potential. NZ's unique tectonic setting delivers an exceptional opportunity for the development of these resources and has the potential to provide an unlimited source of renewable energy while minimising carbon emissions.

The exploration and utilisation of supercritical fluids is dependent on accessible and high-quality thermodynamic data. Currently, there is a wide knowledge gap regarding fluid-rock interactions under the physicochemical conditions which exist in supercritical reservoirs. This lack of knowledge needs to be addressed.

The *GNG* programme will deliver vital geochemical data to understand the effect of fluid-rock interactions at supercritical conditions. Understanding these processes will provide crucial thermochemical constraints that will be incorporated into numerical models. Such models will facilitate enhanced resource definition and prediction.

To perform fluid-rock interaction experiments at supercritical conditions is technically difficult. At GNS we have built a unique experimental system to address these challenges. Our continuous flow reactor allows the study of interactions between geothermal brines and NZ reservoir rocks at temperatures and pressures up to 650ËšC and 230 bar.

The experimental system enables the study of the complex reactions that occur when supercritical fluids react with rocks. The results will be used to understand, interpret, and predict the implications of geochemical processes to infrastructure and subsurface conditions.