

## Challenges in Implementing a Multi-Partnership Geothermal Power Plant

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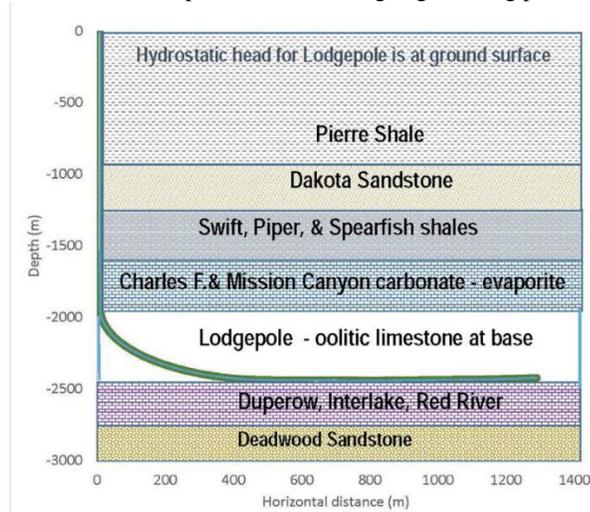
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### ABSTRACT

The UND-CLR binary geothermal power plant project is a piggyback operation on a secondary-recovery water-flood project in the Cedar Hills oil field in the Williston Basin. Two open-hole horizontal wells at 2,300 m and 2,400 m depths with lateral lengths of 1,290 m and 860 m produce water at a combined flow of  $51 \text{ l s}^{-1}$  from the Lodgepole formation (Miss.) for injection into the Red River formation (Ordovician). The hydrostatic head for the Lodgepole is at ground surface and the pumps, which are set at 650 m depth, have run continuously since 2009. Water temperature at the wellhead is  $103 \text{ }^\circ\text{C}$  and CLR passes the water through two large air-cooled heat exchangers prior to injection. In all aspects, the CLR water flood project is ideal for demonstration of electrical power production from a low-temperature geothermal resource. However, implementation of the project from concept to power production was analogous to breaking trail in deep snow in an old growth forest. There were many hidden bumps, detours, and in some instances immovable barriers. Problems with investors, cost share, contracts with CLR, resistance from local industry, cost of installation, unreliability and inexperience of ORC supplier, and the North Dakota climate all caused delays and setbacks. Determination and problem solving by the UND team eventually overcame most setbacks, and in April 2016 the site began generating power.



**Figure 1: Schematic of the water supply well at the UND CLR binary geothermal power plant.**

### REFERENCES

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