Feasibility of Deep Direct Use Geothermal on the WVU Campus in Morgantown, WV

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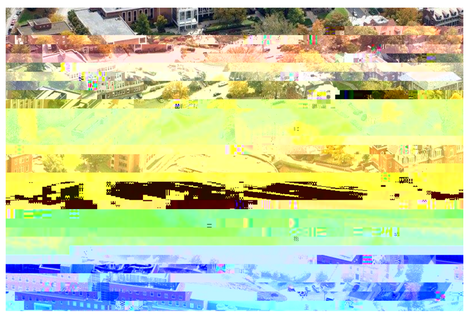
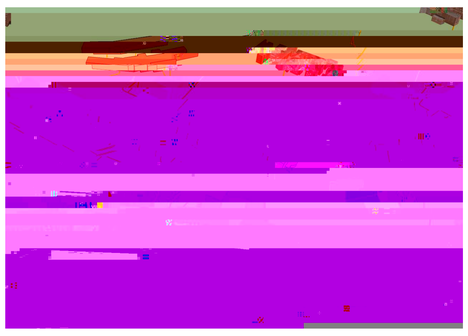
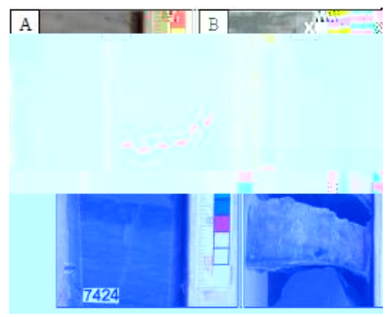
The Morgantown campus of West Virginia University (WVU) is uniquely positioned to host the first geothermal DDU heating and cooling system in the eastern United States, demonstrating that geothermal is a national resource not limited to the western states. While much of the eastern United States is not blessed with extremely high heat flow and elevated temperatures, the northeastern part of West Virginia is unique in having a basin that is expected to support the achievable flowrate of geofluid through target formations in the Appalachian Sedimentary Basin, and sufficient temperatures in those target formations. These two factors were identified by the PI in the 2006 MIT Future of Geothermal Energy Report to be the two most critical factors in minimizing cost of geothermal energy.

In this work a feasibility analysis of developing a Geothermal District Heating and Cooling (GDHC) system for the WVU campus in Morgantown, WV, to replace the current coal-fired steam heating and cooling system will be performed. This system is unique as it will allow for utilization of the geothermal heat, and thus amortization of the costs of the system, across a full 12-month year. The overall project objectives are to 1) decrease the uncertainty and risk associated with developing the geothermal resource for use on campus at WVU and 2) complete an optimized design for the geothermal system, minimizing the delivered Levelized Cost of Heat (LCOH).

Our first goal to minimize the risk of project development will be achieved by decreasing the uncertainty in both the subsurface geothermal system as well the surface distribution system. The subsurface uncertainty is dominated by the uncertainty in the project team's projections of geofluid flowrate in our target formation, the Tuscarora Sandstone. The project's second overarching goal of minimizing the delivered LCOH will be achieved by performing an integrated surface-to-subsurface optimization of the full GDHC system as well as engineering design and analysis of the retrofit potential of each segment of the campus.







Feasibility Project Start

Exploratory Well Planning

Exploratory Well Drilling and Evaluation

Injection Well Drilling and Formation Evaluation

Production Well Drilling and Flow Testing

Distribution System Upgrading

Building Integration

Commission-ing

New System Start