3D Metal Printing of Gas Sparger Head for Airlift Geothermal Technologies

Lifting Geothermal Fluid with the Help of Gravity

Team: Terence Musho, WVU, Nigel Clark, WVU, Dan Hand, Sustainable Engineering, Roy Mink, Mink GeoHydro

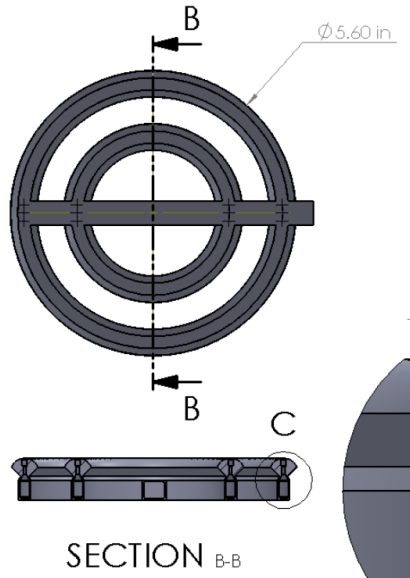
Objective:
To design, optimize, and 3D print an optimal sparger head for a given depth, fluid, and flow requirement.

Technology Advantages:
Airlift Geothermal Approach involves inject high pressure air within well to displace and lift fluids to the surface.
Advantages: Low Cost, Low Maintenance, Access to Deeper Fluids, Less Downtime and Maintenance Equipment.

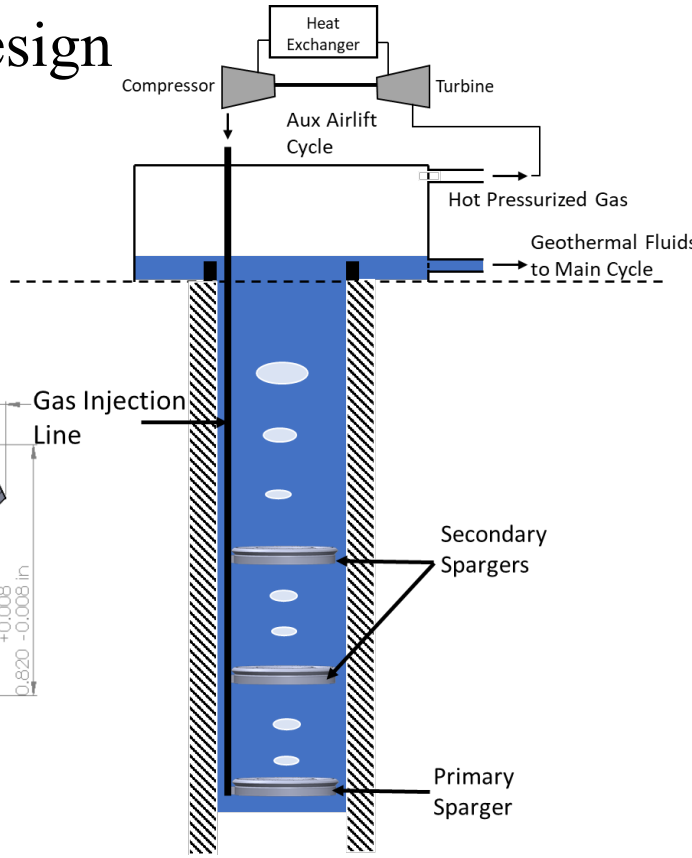
Approach:

- Survey of wells that are typically unviable with traditional extraction methods. Characterize well fluids.
- Determine airlift system requirements (number of spargers)
- Optimize geometry based on a topological optimization approach.
- Determine optimal sparge geometry for a range of depths and geothermal fluids.
- 3D print an optimal sparger head design using 3D additive manufacturing techniques using materials for corrosive environment.

Preliminary Sparger Design



Topological optimization of sparger head.



WestVirginiaUniversity.