Designing Novel Solids Separation

Overview
In order to extend the life of natural gas wells, it becomes necessary to install an artificial lift system to remove water that is weighing down gas molecules. A system located 10,000 feet underground encounters a hot, corrosive, and solid particulate filled environment. Sand particles used in the well creation process along with natural rock formation chips clog and damage artificial lift pumps.

Objective
To minimize or eliminate pump downtime caused by suspended solids in well water.

Approach
- Requirements for the separator were given directly by the sponsor
- Customer needs were generated based on discussion with the sponsor
- Concept scoring matrices were created using weighted ratings
- A detailed patent search was conducted
- A visit to several Marcellus Shale natural gas sites gave us a great perspective on the project
- Solidworks models helped us visualize and create the testing rig
- We thoroughly tested our self cleaning filter concept
- Filter and blowback efficiency results were obtained

Outcomes
Our project was able to generate a proof of concept which gave us the confidence to recommend the following:
- A mesh filter made of a robust metal material
- A blowback line used to periodically clean the filter
- Further testing to verify the claims we made based on our observations