Electrifying Lake Mud

Smith, Fianna (School: Herriman High School)

With need for electrical power increasing around the globe and natural bacteria living in the ground, this work will present a novel solution to meet the energy demands by using the alternative energy generation of microbial fuel cells (MFC). The present work is a continuation focused on using Great Salt Lake mud as the source material because of its abundance of Geobacters. The project focuses on showing that MFCs can be designed into a product that can be used in industrial or military applications. The cell size chosen would produce an average of 376 millivolts and took into account the best spacing and optimal surface area of the anode and cathode within the MFC cell. When 16 cells are combined into a modular MFCs cell pack, the pack would produce greater than 5 volts DC. Additionally, the cell and pack design needed to be able to be 3D printed within the common design dimensions of most fused deposition modeling (FDM) printer beds, x = 250 mm, y = 210, & z = 210 mm, but allow for the MFC cell size to be large enough to meet the voltage requirements. This achievement met both the cost target of the product and enabled a robust design for long-term durability. Finally, the incorporation of a voltage regulator would ensure a constant 5 Volts DC output from the MFCs cell pack enabling the design to power or charge most modern devices.

Awards Won: