



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

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**Project Title**  
**The Work Enacting Capabilities of Methanol and Its Application to Electricity Production Processes**

**Abstract**

**Objectives/Goals**  
This experiment aimed to determine whether or not Methanol(CH<sub>3</sub>OH) would be a more efficient coolant in electricity production processes than water. In order to accomplish this, an experiment was designed to determine if Methanol could produce amounts of pressure, and work by extension, equal to those produced by water.

**Methods/Materials**  
In this experiment a flask was filled with 150 mL. of the sample, Methanol or Water. This flask was then sealed with a double-holed rubber stopper and placed on a hot plate. A piece of glass tubing and a thermometer were then placed into each of the holes in the rubber stopper, and a gas pressure gauge was attached to the end of the glass tube. The gauge was then supported with a test tube clamp attached to a ring stand and the entire apparatus was placed under a fume-hood. In order to ensure that none of the gaseous Methanol escaped from the apparatus Parafilm was applied to the conjunction of the gas pressure gauge and the glass tubing. After the construction of the apparatus, the hot plate was activated and periodic temperature and pressure measurements were taken until the rubber stopper discharged. At this point in time the hot plate was deactivated and the entire apparatus was allowed to cool.

**Results**  
It was found that the Methanol was able to generate equal, and sometimes greater, amounts of pressure than the water at any given temperature. It was also found that the Methanol took a shorter amount of time than the water to increase its temperature, when exposed to the same heat conditions as the water.

**Conclusions/Discussion**  
From this experiment, it was shown that Methanol is able to generate equal amounts of pressure than water when exposed to lesser amounts of energy. This implies that the Methanol could be used more efficiently as a coolant in energy production processes than Water. It was also, however, found that Methanol costs 150 times the amount of water per gallon, and hence it would be economically inefficient to use Methanol as a coolant in energy production processes.

**Summary Statement**  
This experiment aimed to determine the adequacy of Methanol as an efficient replacement for Water in electricity production processes by comparing the amount of pressure it was able to generate to that generated by water.

**Help Received**  
Used lab equipment at Apple Valley High School under supervision of Kathy Meyer.