**Abstract**

Proper utilization of natural resources is becoming more important now because of their environmental impact and their lack of availability in the future. Crude oil is a prime example; proper utilization means harnessing the maximum potential of all crude oil byproducts. Petroleum coke is a major byproduct that has gone under utilized in the past. The primary goal of this project is to show the use of petroleum coke with gasification technology to produce synthesis gas, syngas, that can be used in future chemical productions. Petroleum coke is feed into an entrained bed gasifier along with steam and oxygen to produce primarily carbon monoxide (CO), hydrogen (H2), carbon dioxide (CO2), hydrogen sulfide (H2S) and methane (CH4). The syngas will be cleaned of solids by removing the ash with cyclone and filter technologies. From there that raw syngas must be passed through absorbers to selectively remove the H2S and CO2 individually where upon H2S will be removed and converted into elemental sulfur through the Claus process. It is extremely important to remove as much sulfur as possible from the final syngas because the catalysts used by the chemical production team are poisoned by sulfur. The remaining clean syngas will go to a water gas shift reactor to be properly adjusted to the desired ratio of carbon monoxide to hydrogen. The prepared syngas will then be piped to an over the fence to the chemical production team’s facility to produce acetic acid.