

**rBirzeit University**  
**Mechanical & Mechatronics Engineering Department**  
**Energy Conversion ME 531**  
**Environmental Impact of Power Plants**  
**Homework #6**

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1. Problem 10.2 " Sorensen"

A 600 MW power plant coal with  $S = 1.8\%$ ,  $HHV = 33265$  kJ/kg. The annual plant factor is 0.7 and thermal efficiency is 0.39. Assume that coal is burned in fluidized bed. Sufficient limestone is added to the furnace to reduce the emission of  $SO_2$  to the limiting value prescribed by EPA standards. If the limestone is used on a once- through basis, what are the annual consumption of limestone and the production of calcium sulfate?

2. Explain the polluting effects of  $NO_x$ , and the ways to control its formation.

3. Explain briefly the following

- a) dry  $SO_2$  scrubbing
- b) nuclear power plant waste
- c) acid rain

4. Consider once- through cooling of power plants

- a) What are the polluting effects of this method?
- b) What is the EPA limits on temperature rise?
- c) State three alternative cooling methods for power stations.

**Extra credit Homework**

- a. Obtain the air quality standards for some countries including: a European country, USA, Israel, and an Arab Country.
- b. Look for information on the local air quality in Palestine including main pollutants, GHG, and standards.