Questions for Class 3 (May 4) Practical Combustion Chemical Engineering 733

Reading: ACERC red book, <u>24-45</u>, <u>46-73</u> Biomass Handbook, <u>Ch. 5</u>

1. Please discuss the advantages and disadvantages of making electricity from the

following coal-fired processes:

- Entrained flow (pulverized) combustion
- Entrained flow (pulverized) gasification
- Fluidized bed combustion
- Fluidized bed gasification
- Fixed bed combustion
- Fixed bed gasification
- 2. Postulate on the advantages and disadvantages of wall-fired entrained flow boilers versus tangentially-fired entrained flow boilers.
- 3. Please be prepared to discuss at length Figures 1.10, 1.12-1.13, 1.18, 1.20, 1.22, 1.26-

1.27, 1.29-1.31.

- Describe the major features of a pulverized coal-fired combustor
- How does swirl help combustion?
- What are the walls made of, and why is it so difficult to add more inlets?
- Describe the Rankine cycle and what can be done to improve efficiency.
- Describe how a moving grate combustor works.
- Why is most pulverized coal used the most instead of fixed bed or fluidized bed for electric power?
- 4. Please discuss the following processes and why they are being considered. You will have to search the web for these.
 - Oxy-fuel combustion (with flue gas recirculation)
 - Integrated gasification combined cycle (IGCC)