RLN's notes for discussion
w/ Utah DOH on 5/13/83

1. Describe boiler
   dimensions
   superheater, reheater
   windboxes
   burners
2. Existing NO_x controls
   a. bir is designed to reduce burner zone heat release rate + lower flame temperatures
   b. Dual Register Burner
      - fuel rich inner flame
      - fuel lean outer flame
      - maintains oxidizing atmosphere near furnace walls to minimize slag + wastage
3. Windbox
   a. Compartmentized by pulverizer + burner row
   b. air flow is measured + controlled in each compartment
4. Combustion Control System
   a. controls air + fuel flow
   b. transmits boiler demand to the feeders, PA fans + F.D. fans, in parallel
   c. maintains air/fuel ratio to minimize NO_x

5. Overfire air ports
   a. describe physical changes
      1. small burners
      2. longer sootblowers
      3. access platforms
      4. overfire air ducts + dampers + support steel
      5. add air foils to all windbox compartments
      6. overfire air ports
      7. controls
      8. boiler structure
   b. NO_x reduction possibly to .45 lb/10^6 BTU
   c. Cost: $527,400,000 for 2 units
   d. Schedule: 14 month unit 1 delay } same time
      2 month unit 2 delay } difficult to support
   e. Ramifications:
      1. Lower combustion efficiency
         - increased CO emissions
         - ~~60,000~~ 500 tons coal/yr more fuel ?
         - more of other pollutants as a result of more fuel burned

6. Flue Gas Recirculation

a. describe physical changes

1. gas recirc fans + motors (15% recirc)
2. dust collectors
3. modify economizer hoppers
4. duct work w/ dampers
5. controls
6. complete redesign of convection pass
7. larger FD + ID fans due to pressure drop
8. major redesign of structural steel
9. relocate ppg, electrical, equip, HVAC etc

b. NO_x reduction possibly to .47 lb/10^6 BTU

c. Cost: $1,163,800,000

d. Schedule: Unit 1 delay 2 yrs } same time
Unit 2 delay 1 yr

e. Ramifications

1. higher gas velocities resulting in tube erosion
2. gas recirc fans are unreliable (heat, erosion)
3. major boiler + unit surgery !!!
4. higher auxiliary loads due to fans
5. lower availability
6. 15% reduction in boiler output: load limited

7. Reduced Combustion Air Temperature
   a. describe physical changes
   * 1. remove air heater baskets
   b. NO_x reduction: 0 reduction
   c. Cost: $926,600,000
   d. Schedule:
   * 2. modify baghouse (larger gas volume)
   3. larger ID fans
   e. Ramifications:
   1. air heater exit increase from 280 to 390°F
   2. 3% drop in combustion efficiency
   3. more fuel, waste + pollution
   4. based on 1970 paper w/ gas fired blr w/o NO_x control = 20% NO_x reduction
   5. IPP already has low NO_x burners, requires higher temps for stable combustion + probably would not benefit from this chg.