Homework #2T

Working with your assigned team, develop a spreadsheet model for the problem described below and use it to conduct appropriate analysis to answer the questions listed after the problem description. Your spreadsheet should follow the design principles covered in this course.

Edward W. Munster, or Eddie as his friends call him, is a former child TV star. Eddie left Hollywood behind at the age of 25 and moved to Opp, Alabama to pursue a bucolic career in agriculture. After several unsuccessful attempts at raising exotic animals such as emus, ostriches, and llamas, he discovered a business opportunity in the new technology of cellulosic ethanol. Cellulosic ethanol is a biofuel that has some superior properties to the more widely produced corn-based ethanol. Cellulosic ethanol reduces overall greenhouse gas emissions compared with corn-based ethanol and can be produced from a much wider range of plant materials. Eddie used the remainder of his trust funds to start Eddie's Ethanol Co. (EEC) which owns and operates a cellulosic ethanol production facility in Opp.

The EEC production facility purchases wood waste materials from timber harvesting operations as well as pulp and paper mills across Lower Alabama (LA) and uses these biomass materials to produce cellulosic ethanol. EEC can process up to 540 tons of biomass feedstock per month during the regular production schedule and can outsource any additional production as needed. The current process technology yields 65 gallons of ethanol per ton of feedstock. The production process uses specific enzymes to breakdown the biomass feedstock into different sugars before it enters the fermentation and distillation processes. The production process requires 50 pounds of enzymes per ton of biomass feedstock, and these enzymes cost $52 per hundred pounds. EEC has a contract with a local paper mill to purchase 300 tons of biomass feedstock per month at a price of $62 per ton. Any additional biomass feedstock that EEC requires is purchased on the spot market at a current price of $60 per ton. However, this spot market price fluctuates from month to month between $58 and $70 per ton. The monthly fixed cost of operating the plant is $12,500 with a variable processing cost of $17 per ton for regular production and an outsourced processing cost of $22 per ton. The current market price of cellulosic ethanol is $2.65 per gallon, and at this price Eddie can sell 40,000 gallons of ethanol each month. Based on historical market data every one cent reduction in price increases this demand by 2,000 gallons. Conversely, every one cent increase in price reduces the demand by 2,000 gallons. For the next month, Eddie is planning to sell his cellulosic ethanol for $2.50 per gallon.

1. Construct an influence chart and spreadsheet model for this problem. Document any assumptions you make in constructing your model. Use Eddie's planned ethanol sales price and the current biomass spot market price for the base case scenario.

2. If the contract quantity is fixed at its base case value, at what price should Eddie sell his ethanol?

3. If the sales price is fixed at Eddie's planned value, what biomass contract quantity should Eddie select?

4. What combination of sales price and contract quantity should Eddie use. Provide appropriate analysis to justify your recommendation.