Project 2 IMSE 680

Your company has been asked by Meaty, a meat packaging firm, to evaluate their facility use. Recently, Meaty upgraded their equipment, which has allowed for an increase in the production per employee. Currently, Meaty uses 5 divisions and each division can have two shifts to meet the 2500 tons of production per month.

If a division can be shut down (neither shift is used), then the company will save $140,000 a month in electricity, cleaning, maintenance and management costs. Each shift that is not used will save $30,000 a month. Thus, if a division is closed, then the savings to the company is $140,000+2 shift closings *$30,000 = $200,000.

Table 1 provides the cost of an employee in each shift, the amount of meat produced by a single employee and the maximum number of employees that can be used per shift.

Due to the capabilities of each division and the type of meat that it is capable of producing, the following departmental constraints must be met.

Division 1 must have more employees than division 4.
At least 3 divisions must be open.
If division 4 is closed, then division 3 must also be closed.
At least 2 of the first 3 divisions must be opened.
No evening shift can occur unless a day shift is also occurring.

| Table 1 | Division 1 | | Division 2 | | Division 3 | | Division 4 | | Division 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Shift | Day | Evening | Day | Evening | Day | Evening | Day | Evening | Day | Evening |
| Max Num Employ | 120 | 100 | 150 | 120 | 180 | 150 | 100 | 75 | 300 | 250 |
| Cost per Employee | 2,000 | 2200 | 2100 | 2300 | 1900 | 2200 | 2000 | 2100 | 2200 | 2400 |
| Lbs / employee (tons) | 3 | 3 | 2.9 | 2.9 | 3.1 | 3.1 | 3.2 | 3.2 | 3 | 3 |

Currently Meatco is spending approximately 2.7 million dollars to meet their demand. As is typical for you company prepare a 1 page summary and a technical report.

Technical note, there are so many employees that you can effectively eliminate the integer constraints on the number of employees.