**Case group 9. team member：Wensen Wang，Zhengjie Yang**

Q1: the average heating degree days for this winter is 135.18. In the history the number is 150.19. So the heating degree days this winter are below average relative to all prior winters by 135.18/150.19-1=-9.99%.

Q2: R-squared=0.9, beta=-1.498, intercept=159.38

A screenshot of a cell phone

Description automatically generated

Q3: Historically the intercept is 154.48 and the Beta is -1.48. The historical average is 135.18, so the expected withdrawal=154.48+(-1.48) \* 135.18=-46.

Q4: The beta from the regression is -86.57 and the intercept is 2970, when the natural gas price moves with total 48 current year storage. While the beta is 0 and the intercept is 2.87 when the total 48 current year storage changes with natural gas price. However, in both cases, the R square is 0.004, which is so small that the regression model is not reliable.

When using the correlation method, correlation between the natural gas price and Total Lower 48 Current Year Storage is -0.061, which indicates that the straight-line model through the data explains 0.061^2=0.0037 = 0.37% of the variance of the data, and the negative sign indicates that the slop of the line is negative. We may have to consider other types of statistics that allow us to evaluate our model.

Q5: The beta from the regression is -257.5 and the intercept is 966.3 when the natural gas price moves with storage levels normalized by average storage levels.

A close up of a map

Description automatically generated

With an R square of 0.25, this chart expresses that the regressor is contributing moderately to the explanation of the response variable.

Correlation between the natural gas price and storage levels normalized by average storage levels is -0.506, which also indicating a moderate downhill (negative) relationship. Related to class content, it is reasonable that storage level goes adversely with gas price.

Q6: I would recommend a comprehensive model of natural gas storage include heating days number of rigs and maximum storage capacity.