In today's global environment, our planet is continuously growing at a fast exponential rate. In the same manner, a growing population leads to the means of resource consumption, and we question the values of water management which serves as a source of material disposal. As a result, we developed solutions that allow us to solve global issues of waste management and keep the environment clean as possible. To formulate solutions of this nature, environmental engineers coupled with other professionals must come up with a reasonable statistical hypothesis to solve such problems.

The roaring issue of the environmental effects of storm waste discharge associated with industrial activity has been a paramount one. To elaborate, industrial activities such as construction allows materials of interest to make their ways into our system of drainage such as, drainage manholes and catch basins. Hence, contaminating streams of water.
This experiment analyzes the hardness of water and effected by the contamination of industrial activity. The hypothesis that I look forward to testing is the larger water hardness range will lead to a smaller value of water discharge by the metals. In this case our metals of interest are, copper and zinc. To test this hypothesis, I would use the single sample test, which focuses on a test concerning a single mean of the two-sided hypothesis. Ho: u = 0.00200mg/L and alternative hypothesis will be H1: u > 0.00200 mg/L with a 0.05 level of significance. Keeping in mind, that the test statistic is based on the random variable of X under a normal distribution. (t = (xbar – u)/sigma/sqrt(n)). In the same manner, leading to the choices to accept or reject the alternative hypothesis based on experimental results.

Furthermore, the application of the statistical test is used to determine how far the estimate od from the parameter of interest. The test statistic is the following formula:

Test statistic = (estimate – hypothesize value) / (standard deviation of the estimate)

Referring to the previous case study 8, the constraints for copper based on the given benchmark was:
mean = 0.00620267
standard deviation = -0.00217815
variance = 4.74432E-06

on the other hand, the constraint for zinc based on the given benchmark was:

mean = 0.04266667
standard deviation = 0.03085858
variance = 0.00095225

copper:
Test statistic = (0.00620267–0.00200) / (-0.00217815) = -1.93

Zinc:
Test statistic = (0.004266667–0.200) / (-0.00217815) = -1.04

Observing the areas under the normal curve chart, one can conclude that copper's value of -1.93 corresponds to, 0.0268 and zinc's value of -1.04 corresponds to 0.1492.

In conclusion, Ho, value was observed to be the value of, 0.00200, the test statistic produced an extreme value beyond the observation. The results above prove that we can accept the null hypothesis because we obtain reasonable acceptable values under the normal distribution curve. Hence, we will need to reject the alternative hypothesis which is false according to our calculations.