rope-cathead system. Donut-type hammers typically have a lower efficiency that range from about 40 to 50%.

Calculations of the $N1_{60}$ values and background information for the correction factors are provided in Attachment C. Plots of the $N1_{60}$ values versus elevation of the recorded blowcount for the pre-flood and current investigations are presented in Figure A-1. Using the correlations and procedures recommended by Robertson et al (1986) and Lunne et al (1997), estimates of $N1_{60}$ were derived from the CPT data and these data points have been included in these plots.

As depicted in Figure A-1, the $N1_{60}$ values from the pre-flood and current investigations show a similar pattern and scatter of blowcounts that range from 2 to 60 blows/foot along the full depth of the subsurface profile. The mean and standard deviation for the pre-flood and current $N1_{60}$ values are plotted in Figures A-2 and A-3 along the full depth of the profile. These plots also display a similar range and scatter of values.

6.0 Preliminary Findings and Conclusions

Comparison of the computed $N1_{60}$ values for the pre-flood and current investigations indicate that there was no observable difference in the overall geotechnical conditions at the site and that the foundation materials have not been disturbed or significantly weakened from the flood inundation. In addition, comparison of the seismic refraction data from the pre-food and current investigations reveals similar magnitudes of p-wave velocities over the full depth of the overburden soils, and no observable differences were identified from this work. The presence of loose to medium dense zones with lower p-wave velocities interbedded within denser materials confirm the inherent variation in the resistance data retrieved in the pre-flood and current investigations.

Based on these findings and evaluations, it appears that the overall geotechnical conditions at the site have not been significantly altered due to the sustained high water. The observed scatter of data points in both plots is consistent with the relatively wide range of strength and stiffness and corresponding blowcounts typically encountered in the alluvial soils within the Missouri River valley.

It should be noted that the findings and conclusions from the SPT comparative analysis are considered applicable only to those existing soils below a depth of 10 feet at the site, or below an elevation of about 995 feet, since these soils were hydro-excavated to avoid damaging buried utilities. The upper 10 feet of soil may have been disturbed from underseepage and high exit gradients beneath the temporary levees during high water. Additionally, disturbance to the site could have been resulted from the settlement of utility backfill during drawdown of the river level and groundwater.

It should also be noted that additional test borings are planned at the site and the data from this SPT sampling will be incorporated into this study when available.

Additionally, it should be noted that these findings and conclusions are not applicable to the potential impacts that may have occurred due to the presence of the broken piping and groundwater flow into the Turbine Building Sump since the time of our site visits and current investigations.