Since the discovery of radioactive decay, radioactive decay rates have consistently shown to be constant. Recently, groups of researchers around the world have noticed variation in the decay rates of different radioactive isotopes, while other groups have noticed no such effect. If the variation is truly varying decay rates, this would imply groundbreaking new physics and would have implications for practices such as carbon dating. More sophisticated experiments are required to determine if the variations are truly new physics or systematic effects inherent to nuclear decay experiments. We are building an experiment where activity data from various radioactive sources will be taken with NaI(Tl) detectors at different places around the world (Purdue University, Nationaal Instituut voor Kernfysica en Hoge-Energiefysica [NIKHEF], University of Zurich, one more to be decided). Previous studies have not used our data acquisition methods which will allow for a richer analysis to check for time variations. At this point, all components have been acquired and construction of the experiment is underway. I have performed several tests on our new sodium iodide detectors and used the results to determine the optimum operating voltage test. This test will be performed on each of the detectors to determine the voltage at which each one should be operated. Currently I am performing more tests to determine the amount of lead shielding needed between each detector. Our work will be very important in determining systematic sources of error in nuclear decay experiments and solving the puzzle of modulating radioactive decay rates.