The computational power available today due to the relative low cost of desktop style PCs has greatly increased the availability of the necessary resources for scientists to solve numerical models of complex processes involved in various technologies. NETL utilizes parallel computers to assist researchers in fossil energy research. This research often involves constructing large, complex, and very costly test units for development of advanced technologies to be integrated into the nation's power plants. In an effort to reduce the necessary resources engineers and scientists are now turning with more confidence to numerical models. Many aspects of the research steps can be significantly shortened by using numerical models to accurately predict behaviors in various complex systems such as combustion dynamics, gas stream cleanup and fuel efficiencies. By utilizing arrays of processors these models are being solved at a fraction of the time they were only a few years ago reducing cost and development time of the actual test apparatus. Further benefit of these models is to provide validation for the data generated giving confidence to the science. As resources grow more limited over time, researchers are going to rely more heavily on computational sciences.