This project aims to demonstrate the possibility of safely increasing nuclear power as an energy source in America by analyzing initial site options for a once-through water-cooled nuclear power plant. The state of Indiana was chosen due to its heavy reliance on coal as a power source, combined with a high per capita energy consumption relative to other U.S. states. To perform this analysis, the raster calculator function in ArcMap was used to overlay spatial data including current land use, hazard areas, water availability, and population density. Selections were buffered around major population centers. The calculation resulted in approximately 200 square miles of “best suited” land recommended for further investigation near Bloomington, and 100 square miles near Terre Haute. These areas are also recommended for their proximity to the growing city Indianapolis. This analysis concludes that Indiana is a physically viable option for expanding nuclear power generation and decreasing national carbon emissions.