

EXECUTIVE SUMMARY

This purpose of this document is to study of the Westinghouse Electric Company Nuclear Power Headquarters Campus and the construction methods used to complete the project. Located in Cranberry Township, Pennsylvania, the Westinghouse Campus consists of three buildings. This senior thesis focuses on Building One of the campus. Building One is the largest of the three buildings and consists of office space, conference rooms, a data center, and a cafeteria among others. This report provides more background on the campus including preconstruction, architecture, and construction information. Following the background information, three in-depth analyses were performed. These analyses focused on energy and the environment, the concrete slab systems, and the implementation of Building Information Modeling. All of these analyses were done with specific goals in mind, but all of them were done in an attempt to add value to the project.

One of the leading issues confronting the construction industry today is the “green” movement. Owners are demanding more environmentally friendly and energy efficient buildings. Because of this the first analysis explores the finishes within Building One of the Westinghouse Headquarters Campus. These items were checked for their compliance with LEED standards as set forth by the U.S. Green Building Council. In additions, the performance of the windows was investigated. It was determined that a large amount of energy could be saved by implementing PPG Solarban 80 windows instead of typical double pane, tinted window. This energy savings also could affect the mechanical system by reducing the load on the building. The cost to run the mechanical system would also decrease.

The second analysis focused on the concrete slab-on-decks in Building One. The pouring of these slabs lied on the critical path of the construction schedule. The purpose of this analysis was to explore the possibility of implementing a precast concrete deck system in an attempt to reduce the current schedule and possibly save money. The analysis looks at using Nitterhouse Concrete Products to fabricate double tees, ship them to the site, and erect the double tee members using a crane. It was found that the schedule could be reduced by 58 days and a cost savings of approximately \$1.6 million could have been seen. Implementing this system had an effect on the structural system. These ramifications were investigated and it was determined a larger beam size would need to be used.

The final analysis involved another leading issue facing the construction industry: implementation of Building Information Modeling (BIM). BIM was not utilized due to a fast track approach to construction. The assigned staff to the project was not familiar or comfortable with its use; therefore BIM was viewed as an obstacle to successful completion instead of an effective tool. This analysis explores the advantages to using BIM. Also, a mechanical room of Building One was modeled and clash detection software was used. Clashes were detected between the plumbing and mechanical systems and the plumbing and structural systems. The potential savings from detecting the clashes are difficult to quantify. Also difficult to determine is the overall cost and schedule affects of using BIM. A discussion of these points is also included.