Executive Summary

The Woolly Mammoth Theatre Company's mission is to make new, edgy and provocative productions. This sets the stage for the theatre's theme of a 'transparent theatrical laboratory". All of the spaces which are normally hidden from patrons, including rehearsal halls, classrooms, offices and other support spaces, are open to be seen. This will give the patrons a "behind-the-scenes" look at making a live theater production. Throughout the space this theme is portrayed through the lighting, style of architecture and the finishes.

The first part of this report will consist of an in-depth study of the lighting design for the building. The overall lighting concept in the building must enhance the architectural concept. New designs are proposed for four spaces; the canopy, the lobby, the theatre and the office suite. Included in this study are conceptual design, luminaire selection, lamp and ballast selection, fixture placement and the necessary calculations.

An analysis of the building's electrical system is the next section of this report. The electrical redesign of the four newly designed lighting spaces was performed, including the electrical and control plans, and all wire and panel sizing. A complex control system was specified for the flexibility of the canopy and lobby spaces. Also provided in this section is a study of the copper versus aluminum wiring. This study shows the price of aluminum is cheaper, but it is still not feasible to change all the wiring in a building to aluminum. A comparison analysis of screw base and pin base compact fluorescents was performed as well. The advantages and disadvantages of the both were described.

The next part of the report is an analysis of the hydronic heating systems. Hydronic heating systems have many advantages over electric resistive heating systems. Hydronic systems were thoroughly researched and the advantages were described. Next the existing electric heating system for the Woolly Mammoth Theatre was analyzed for initial cost and energy consumption cost throughout a year. A new hydronic heating system was then designed for the space, including sizing of all necessary equipment. This system was analyzed for initial cost and energy consumption cost throughout a year and compared to the existing system. From this information a payback period of about six weeks was found. The hydronic heating system has many benefits over the existing heating system and has the opportunity to save the theatre company a lot of money over the course of the theatre's life.

The last analysis is an acoustic analysis of the theatre space. The theatre space is the most important space acoustically. Patrons come to the Woolly Mammoth Theatre to view productions, and expect good quality. A reverberation time calculation was done to check the existing materials in the theatre. This reverberation time was found to be slightly too high for the ideal situation of the theatre. An acoustical redesign was performed and the reverberation was then taken with the new materials. This reverberations time was the ideal time for the theatre. From this it is easy to see that material absorption is very important in the theatre environment and the change of one material in a space

The Woolly Mammoth Theatre is a very unique and complex space. It has specific design needs which must be taken into account in every aspect of the building. This report provided the integration of architecture, energy consumption, and aesthetics into many of the building systems.