EXECUTIVE SUMMARY

This report contains proposed changes redesign topics for the Pennsylvania State University Chemistry Building located at the University Park, PA Campus. The ventilation requirements of laboratory facilities are complex compared to other building types. The chemistry Building uses a ventilation system as the primary safety shield, not only for the researchers working at the fume hood, but also for all building occupants by preventing noxious fumes from migrating outside the lab. Maintaining proper room pressurization requires that the total exhaust and make-up air supply always be balanced. In addition to safety, comfort must also be maintained in spaces that require conditioning as continuous supply of outside air. The energy costs for operation of a laboratory facility are quite high due to ventilation requirements. This paper will develop on saving energy while still fulfilling those ventilation and thermal comfort requirements. The paper will first develop on the existing systems in place, which will lead into considered alternatives for those systems. And will be followed by a proposed redesign to make the building more efficient. The redesign will be supported by a justification section, and integration/coordination section. Other additional improvements to the building will be mentioned in a breadth section. A proposed method for completing this redesign and schedule for doing so will follow last.

The redesign will look at the implications of using a VAV system for its energy saving qualities. The new VAV system will produce a pressure independent system by varying exhaust and supply. The redesign also includes a heat recovery system between exhausted laboratory air and outdoor air intake, and the changing from electric chillers to steam driven chillers for energy conservation.

Breadth areas include a smoke evacuation design for an atrium space, and acoustical design to reduce noise carry over between labs and office spaces.