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PENNSYLVANIA STATE UNIVERSITY  
CHEMISTRY BUILDING  
TECHNICAL ASSIGNMENT #3



## EXECUTIVE SUMMARY

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The following report is an evaluation of the mechanical systems of the Pennsylvania State University. In the report requirements and objectives for construction will be discussed first, leading into equipment. Equipment will be developed into two parts. The first part will display schedules, while the second part will display setup and usage using schematics and brief explanations. The report will conclude with a critique of the building and its systems.

Design objectives and requirements for this project range from site factors to use of an existing steam and chiller service setup. The first requirement that the designers had to deal with when designing the Penn State Chemistry Building was the area confines. The building was to be built on a plot of a land which was bounded on three sides by existing buildings while on the fourth was bounded by a street. In addition to these site confines, located within the site were two historical landmarks which had to be avoided from when Penn State was a farmer's college.

Because of this building being primarily a lab building several mechanical criteria had to be met. The first criteria that had to be met were the ventilation requirements supplied by ASHRAE 62.1. Also because the lab would contain volatile substances, the lab would have to be continuously exhausted. This resulted in the labs being at a negative pressure causing raised infiltration, which affected the demand schedule. Other criteria which affected the demand schedule where the hour of operation due to the building not having set occupational hours. These two factors resulted in flexibility being built into the schedule, and the down time being set at 20% for an off load requirement as suggested by the original design team to compensate for infiltration and the large amount of glazing. This greatly affected the building loads and energy use which can be noted from the tables in their corresponding sections.

In the remainder of the document, building schedules and operation of systems will be discussed in detail using schematics and brief explanations. The systems covered in these areas are: steam, hot water, chilled water, condenser water, and air flow.

The final section of this document is Critique of Systems. The Chemistry Building is fashionably integrated into the Penn State campus. Its design avoided disrupting historic sites and pedestrian traffic paths between buildings, while creating its own pedestrian path between itself and its sister building Life Science. In addition the building takes full advantage of the already existing systems of chilled water and steam in place for the campus. Only one small problem exists with the system keeping it from 100% satisfaction, a small problem with the buildings air handlers