

A. Power Distribution Systems

A. Report – Prepare a narrative, with associated tables where applicable, describing the following:

a. **Executive Summary**

b. **Summary Description of Distribution System**

- i. Medium voltage power comes onto the site from the power company via overhead service. From there it enters three transformers located on an overhead rack. Some of the power is distributed to high voltage equipment, however the rest of the power is stepped down to a lower voltage to power the office portion of the building.

c. **Utility Company Information**

- i. The United Illuminating Company, P.O. Box 1564 New Haven, CT 06506-0901, <https://www.uinet.com/wps/portal/uinet/home>

ii. **Rate Per Month:**

Generation Charges

January – December Standard Service Generation

On-Peak

13.5973¢/kWhr

Off-Peak

10.5973¢/kWhr

Delivery Charges

Systems Benefits Charge (SBC)** 0.3375¢/kWhr

Conservation Charge** 0.3000¢/kWhr

Renewable Energy Charge** 0.1000¢/kWhr

Non-Bypassable FMCC*

On- Peak

Winter: Jan. – May (0.2235¢)/kWhr

Oct. – Dec. (0.2235¢)/kWhr

Summer: June – Sept. (0.2437¢)/kWhr

Off- Peak

0.0000¢/kWhr

- iii. Electric Utility Load Summary is attached

d. **Service Entrance**

- i. Primary Service: 4160V overhead service comes on site from the south-west corner of the lot and is run across three utility poles to an assortment of transformers located on the lower east side of the building
 - ii. Secondary Service: a 240V feed off of the utility pole enters the building through the south wall. This service was previously used by a past subtenant, but is no longer used.
- e. Voltage Systems
 - i. The factory floor utilizes primarily 480V 3-phase delta, however some equipment uses 240V 3-phase. The office portion of the building uses primarily 120V and 240V single phase.
- f. Emergency Power Systems
 - i. The emergency system is battery backup. It is not quite clear where the emergency system ties into the building. I have requested more information on the subject.
- g. Locations of Switchgear
 - i. All gear is located in an electrical room on the lower east side of the building, adjacent to the primary service. A schedule of the switchgear has not yet been acquired
- h. Over-Current Devices
 - i. Panel boards are located in closets on each floor. A schedule of the panel boards has not yet been acquired.
- i. Transformers
 - i. There are three transformers located on an overhead rack adjacent to the electrical room. There are also six more transformers in a vault, which is also located adjacent to the electrical room

INDIVIDUAL TRANSFORMER SCHEDULE							
TAG	PRIMARY VOLTAGE	SECONDARY VOLTAGE	QTY	SIZE	TYPE	MOUNTING	REMARKS
T-1	4160,3PH,3W	480Y/277V,3PH,4W	3	150	DRY TYPE	OVERHEAD RACK	
T-2	480V,3PH,3W.	240Y/120V,3PH,4W	3	100	N/A	PAD MOUNTED	
T-3	480V,3PH,3W.	240Y/120V,1PH,3W	1	75	N/A	PAD MOUNTED	K-13 RATED
T-4	480V,3PH,3W.	240Y/120V,1PH,3W	2	37.5	N/A	PAD MOUNTED	

- j. Grounding
 - i. The electrical system is grounded on elements of the structural steel. The plan that would show grounding has not been obtained.
- k. Special Equipment
 - i. X

- l. Lighting Loads
- m. Lighting Control
- n. Mechanical and Other Loads
- o. Service Entrance Size
- p. Environmental Stewardship Design
 - i. There is certainly a lack of energy efficiency pertaining to the electrical system. The only area that may be considered efficient is the lighting systems.
- q. Design Issues
 - i. The biggest issue I can see so far is related to the age of the system. Though no in depth study has been performed, I assume that there is much room for improvement in the ways of efficiency. The transformers, for instance, are decades old and may need to be replaced.

B. Single Line Diagram Drawing List

B. Communication Systems

- C. Report – Prepare a narrative or organized list describing the following:
 - a. Summary Description
 - i. There are basically two types of communication in my thesis building. First is the computer server. The company is reliant on computer use. One of the main forms of communication is email. Emails go to both external contacts, as well as stay within the network, such as an email to a coworker. So not only do the Ethernet connections need to connect to the company's network, but they also need to connect to the internet for outbound data transfer.
 - ii. The second form of communication is via the telephone. Though not any more or less effective than emails in regard to day to day communication, the telephone is crucial in conference calls, when an employee is out of town and needs to listen in on an important business meeting.
 - iii. The offices utilize a floating floor system. Data lines are run within the floor cavity.