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1.0 PURPOSE & SCOPE:

Life safety and asset/research preservation is one of Washington University School of Medicine's (WUSM) highest priorities. To ensure the highest possible reliability of electrical systems, WUSM has built a robust infrastructure with multiple layers of redundancy to handle any power event. With that said, it is imperative critical loads are managed and prioritized within the buildings to ensure systems operate as intended. If the systems are overloaded, all life safety and asset/research preservation is sacrificed.

The purpose of this guideline is to provide a general understanding of the electrical distribution systems that support the School of Medicine buildings and also, to provide our customers with a clear set of actionable guidelines that will ensure valuable research and assets are preserved in the event of a power outage.

2.0 ACRONYMS & DEFINITIONS:

- Normal power – Electricity supplied and delivered by the local electric utility company
- Substation – A distribution center that receives electricity from the local electric utility company and distributes to a group of buildings
- Life safety emergency power – Emergency power needed for egress lighting, elevators, and fire protection
- Customer emergency power – Emergency power provided to areas that are primarily research space, to support critical loads like -80° freezers, incubators, and other power sensitive equipment
- Customer emergency power watts per NASF – A calculated allocation of emergency power distributed for critical customer equipment

- Red Outlets – Customer emergency power outlets are typically red in color designating they're back up power source.
- OFMD – Operations & Facilities Management Department

3.0 AUTHORITY & RESPONSIBILITY:

- It is OFMD's responsibility to ensure the electrical distribution systems are maintained and operate at peak dependability.
- It is OFMD's responsibility to ensure the emergency power systems are not overloaded so they operate as intended.
- It is the department's responsibility to ensure their emergency power needs are prioritized and the spaces with the highest need are connected to the emergency power system.
- It is the department's responsibility to manage their customer emergency power use, at each location, and stay within their allocation of customer emergency power watts per NASF.

4.0 ELECTRICAL POWER SYSTEMS:

Local Utilities

- Our local electric utility, Ameren MO, supports the St. Louis region. Ameren's reliability and power quality has been very sound in comparison with the rest of the nation. Ameren supports the School of Medicine with multiple power lines coming from multiple direction to insure immediate recovery during an interruption.

Normal Campus Power

- The WUSM buildings are supported by 4, 100% redundant substations owned and maintained by WUSM. All 4 substations are supported by 2 separate Ameren MO power lines. In a power loss event, on either Ameren line, all substations are equipped with an automatic switch that transfers the buildings off of the failed power source to the other functioning Ameren power source. When there is an automatic transfer, the customers only see a momentary loss of power in the building.
- In the last 25 years, there has been only 1 occurrence where both Ameren power lines on the same substation experienced a loss of power.

Normal Building Power

- All research buildings' normal power is supported by 2 separate power lines from a WUSM substation. In a power loss event on either WUSM power line, all buildings are equipped with an automatic switch that transfers the building loads off of the failed power source to the other functioning Ameren power source.
- In the last 25 years, there has never been a simultaneous loss in power of both WUSM power lines to any building.

Emergency Power

- For all research buildings, there exists a third source that is powered by an emergency generator. In a power loss event of both WUSM power lines supporting the building, an automatic switch transfers life safety loads as well as critical customer loads to the emergency generator distribution system.

5.0 AVAILABLE CUSTOMER EMERGENCY POWER ALLOCATION:

- Research buildings are supported with a normal power distribution system and an emergency power distribution system. The emergency distribution system in most buildings is identified by red outlets throughout the building.
- Since the emergency distribution system is supported by a finite power source and a limited distribution system, loads are prioritized to ensure life safety requirements are met and as many critical customer loads as possible are supported.
- Available customer emergency power is determined by the generator capacity minus life safety loads.
- Once the total available customer emergency power is determined, it is allocated by the total NASF of research space.
- This allocation is shared with the customers in "***Customer Emergency Power Watts per NASF***".

6.0 EMERGENCY POWER MANAGEMENT:

Operations and Facilities Management Department Emergency Power Management

- Available customer emergency power is distributed equally to each floor, to all laboratory NASF.
- All emergency power panels are periodically measured to prevent overloading of the systems.
- Since there is a limited amount of emergency power, if research/laboratory space expands in a building, the overall customer emergency power watts per NASF will be reduced.
- Departments will be given their total customer emergency power availability for each laboratory area.

Customer Emergency Power Management

- If the customer emergency power is not collaboratively managed, the emergency power system will be overloaded and fail when it is most needed.
- Departments are asked to develop a prioritized **Customer Emergency Power Equipment List** by floor/area of equipment needing to be supported by customer emergency power.
- The list should include type and power requirements (amps or watts) for each piece of equipment.
- The power requirements should be totaled and compared with the total allocation for that area.
- If the total power requirements of the list exceed the total allocation for that floor/area, the department should collaboratively reduce the equipment list to equal the total allocation of that floor/area.
- During renovations or as new PIs come on board, departments should update their **Customer Emergency Power Equipment List** to ensure the highest need is supported and the overall customer emergency power doesn't exceed the floor/area allocation.
- OFMD will be happy to assist the departments in this process. Please call the Facilities Engineering Support Supervisor at 314-362-1591 for support.