



Engineering & Operations Committee

Overview of Arc Flash Safety Planning

Item 6b

May 10, 2022

Electrical System Background



Staff performing electrical maintenance on 230kV circuit breaker

Safe, reliable power is essential for treating and delivering water

- Metropolitan has electrical infrastructure at 5 treatment plants, 15 hydroelectric plants, 7 pumping plants and numerous turnouts and pressure control structures
- Metropolitan has over 1,000 electrical systems from 480 volts to 230,000 volts
- Metropolitan has a strong and well-established safety culture and program

What is Arc Flash?



*Switchgear undergoing arc flash testing
(Stock image – Not a Metropolitan facility)*

Arc flash is the explosion or flashover of electric current traveling through the air similar to the energy of a bomb blast

- Serious injury and property damage can result from arc flash events
- Arc flash is governed by electrical codes, standards, and regulations which are constantly evolving
- Recent regulatory changes require additional analysis of arc flash hazards
- Metropolitan's electrical safety program must evolve with these industry trends

Arc Flash Safety at MWD



Photo from 1978 Eagle Mountain arc flash incident

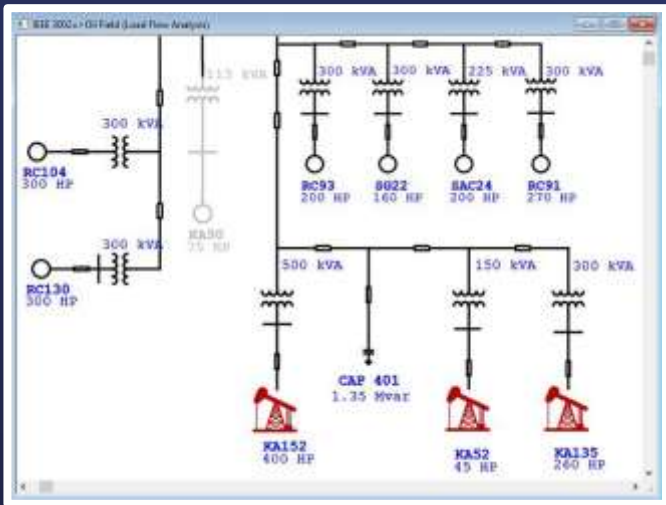
Significant arc flash incident occurred in 1978 at Eagle Mountain Pumping Plant

- Led to Metropolitan centralizing electrical safety and other procedures through the development of System Operating Orders Manual (SOOM) in 1979
- Metropolitan evolved and developed a Health Safety and Environmental (HSE) Manual section based on National Fire Protection Association (NFPA) Standard 70E
- Arc flash studies are required to be reviewed every 5 years by NFPA 70E

Arc Flash Studies

Arc flash studies are required to assess hazards and conform to best practices including:

- Gathering all electrical system data and field verifying for accuracy
- Modeling collected data in software
- Having a qualified professional engineer perform an arc flash hazard analysis
- Creating and applying arc flash hazard labels on field equipment to enhance worker safety



ETAP power system analysis software single line diagram

Arc Flash Benefits



Switching at Venice (HEP)

Performing arc flash analysis provides numerous operational benefits and safety improvements:

- Identifies areas with highest safety risk
- Ensures protective devices are properly configured to work as needed
- Ensures electrical drawings are up to date and accurate
- Front-end engineering of capital project effort is reduced
- Enhances employee safety and reduces the risk of operational upsets

Arc Flash Safety Planning Summary



*Staff racking out circuit
breaker at Corona HEP*

- Arc Flash Study will require significant resources and planning
- Metropolitan has a large geographical and electrical system footprint
- Metropolitan has a history of a robust electrical safety program
- Electrical Arc Flash is a serious hazard and exposure varies significantly based on specific installation details
- Existing arc flash hazard labels and arc flash studies required to be reviewed every 5 years

Arc Flash Safety Planning

Next Steps



Staff isolating equipment for maintenance at Skinner WTP

- Performing arc flash analysis at all Metropolitan facilities will be a multi-year effort
- Staff will bring an action on this effort in the near future for Board consideration
- Arc flash analysis may lead to:
 - Improved safety procedures
 - Minor or major capital projects to improve system safety and reliability
- Staff are benchmarking arc flash hazard analysis strategy with other agencies

