

Safety Alert



March 16, 2009

Electrical Arc Flash Near Miss

A significant near miss/incident occurred when uninsulated wires in a live panel shorted and the breaker exploded, causing an electrical arc flash.

What we know:

- The electrical subcontractor was inside the 480v inspecting the panel for installation of new breakers.
- The breaker that exploded protected the lighting circuit on the 4th floor of the hospital's Neonatal Intensive Care Unit and the 3rd floor X-Ray rooms.
- Two events occurred in conjunction with one another leading to this incident.
 - The first event occurred when the electrical subcontractor opened the live panel and removed insulation from the wires causing the first arc to occur and the breaker to open.
 - When he attempted to close the breaker the main power supply breaker opened or shut off. As a result, the lighting on the 4th floor and the 3rd floor X-ray rooms went out.
- Without reporting the incident to his supervisor or investigating to see what damage might have been done to the breaker, panel or main power supply, the electrician attempted to turn the main power supply back on.
- As a result, when the power went back on line the breaker was overloaded with energy, causing another arc to occur and the breaker to exploded propelling hot gasses and molten metal out of the breaker.
- The hot metal made contact with the front and top portions of the electrician's hardhat, narrowly missing (his face) and causing damage to the panel.
- No injuries or ill-health effects resulted.

What we can do to prevent similar or further incidents:

- Due to the severity of the event and history of subcontractor safety infractions on site, the electrical subcontractor was suspended from all future work activity at this project.
- Communication outlining the task description shall take place with all parties involved. In this case the client/ owner, PCL supervision and workers.)
- A specific Job Hazard Analysis will be completed prior to any work activities and reviewed with all parties involved.

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What we can do to prevent similar or further incidents continued:

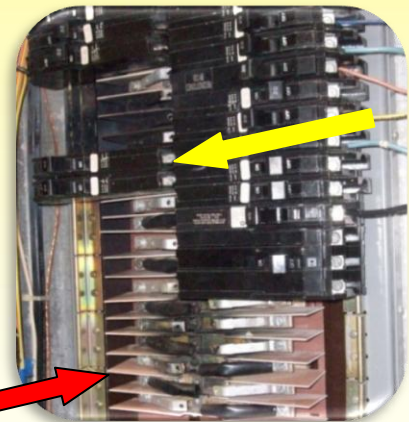
- The requirements in NFPA 70E will be published to those preparing the JHA and considered.
 - NFPA 70e requires the calculation and reaction of a “flash protection boundary”. The imaginary boundary, which surrounds the potential arc point, specifies what level of personal protective clothing and equipment must be used by qualified workers who enter within that boundary. NFPA 70 defines a “flash protection boundary within which a person could receive a second – degree burn in an electrical arc flash were to occur” It also defines incident energy as “the amount of energy impressed on a surface, a certain distance from the source, generated during an electrical arc event.”
- The power to the panel shall be disabled and Lock Out / Tag Out are to be in place prior to any work inside an electrical panel.
- PSI will be done prior to the start of the task.
- Proper arc flash personal protective equipment is to be used.



Left: This is the breaker after the incident occurred.

The inside of the breaker was charred throughout.

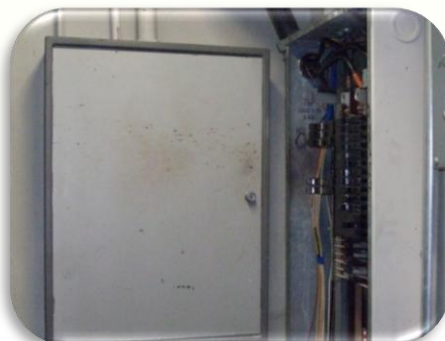
Metal pieces had been melted and some metal had been disintegrated.



Above: Damage to the panel can be seen at different areas of the panel.

Yellow arrow shows where the breaker was housed .

Red arrow shows where it is believed he was in the process of removing the rubber insulators, which caused the initial arc.



Left: Damage to an adjacent panel covering can be seen.

Notice the brown marks on the exterior panel door. This occurred when the breaker had exploded, emitting molten metal out of the breaker.

The individual involved was about 5' tall. The material grazed the front and top of his hard hat. His height is the main reason why he was not injured.

