



ES&H NEWSFLASH

Actionable. Engaging.

June 7, 2019

Recent Electrical Safety Events at Other DOE Labs: Learning from Others' Missteps

By: Mike Clancy

SCoR Principles:

- Everyone is personally responsible for ensuring safe operations.
- A questioning attitude is cultivated.
- Learning never stops.
- A healthy respect is maintained for what can go wrong.

Over the last few weeks, three of our sibling DOE Labs have each experienced a serious electrical event, two of which resulted in a shock to a worker. As a learning organization, we need to closely review such events and our operations and experiments to make sure we don't make the same or similar mistakes. As Eleanor Roosevelt said, "Learn from the mistakes of others. You can't live long enough to make them all yourself."

As you'll read below, there are important lessons to be learned that can be applied to all workers. *Please review closely and share with staff:*

Jefferson Lab Event: A technician was troubleshooting a Radio Frequency (RF) separator and reported to the subject matter expert (SME) that he could not correct the problem. He told the SME that the panel he was working in was covered and energized. The SME went to the area by

himself and began to troubleshoot the unit when he received a shock that knocked him to the ground. He was able to crawl out of the building where a passing motorist was able to get him to the local medical center.

Based on what we know, the SME may have been relying solely on his expertise and not work planning, which includes identifying all hazards before doing the work. **Overconfidence** by the SME may have caused a belief that the chance of a shock was very low. Approaching each job with the "eyes of a rookie" when looking for hazards is very important for experienced workers, including SMEs.

SLAC National Accelerator Laboratory Event:

A contractor cut through an energized 480-volt line. The conduit was painted per the site procedure to indicate that the line was de-energized. Previously, a SLAC electrician had traced the conduit but he did not see that there was a *second* conduit in the area due to an obstruction. In this case, the wrong circuit was deenergized. Thankfully, when the line was cut, the contractor was not hurt.

This situation may be seen at Brookhaven Lab, especially in older facilities where changes were made over the years and the drawings have not been updated in quite some time. When facing this situation, having a **questioning attitude** and a **healthy respect for what can go wrong** is vital.

Other questions that workers could ask in this situation:

- Is there a way to do a zero-energy check on the wires within the conduit? To do this, a worker would need to visually trace the full length of the line to see where it ends.
- Are there other ways to get an indication, such as with toning equipment?
- Can we get a second set of eyes on the tracing or talk to people that worked in the building to fill in the gaps?
- Before we do a job, we should ask: **“Is this the safest way to do the job? What else can be done?”**
- **A questioning attitude is cultivated.** Ask the hard questions, and don't accept incomplete answers. In many situations, your gut feeling is an accurate indication.
- **A healthy respect is maintained for what can go wrong.** As we get more and more experienced in areas with hazards, our experiences start to make us believe that the hazards are less risky. This is human nature.
- **Try to maintain “rookie eyes.”** Overconfidence because of experience blinds us to the real hazards. When we are planning and performing work, and we lose that respect for the hazard, as shown above, even SMEs get hurt.

Los Alamos National Lab Event: While working on a Febetron X-Ray unit (2.3 megavolt) 160-stage Marx generator, a technician observed two indications that the unit was not performing as expected based on measurements that were taken, yet continued to perform work. As he used a steel tape to take a measurement, the tape end touched the base plate and his elbow touched the frame, and he received a low-energy, high-voltage electrical shock.

This is a prime example of when having a **questioning attitude** might have made a difference. When you are working on a familiar piece of equipment and see it is acting “funny” or **outside the expected ranges** of the work, it's time to stop, step back, and assess the situation.

Examples of this might be taking a volt reading and expecting 100 V but measuring 60 V, or you expect that the RPM of a motor to be 1500 RPM and it is 2000 RPM. These are the times to **take a step back** and ask for help. Don't just keep pushing forward.

Our sibling labs are learning from these events. We are grateful that the workers were not seriously hurt, as these events could have had much greater consequences. Let's learn from their experience. In summary, here are the key points we can all learn from this: