Electrical Incidents

Two minor electrical incidents in the past months at the APS resulted in a minor shock from inadequately grounded equipment, and a damaged stainless steel waterline when an arc occurred between the waterline and defective heat tape.

The investigation of the shock incident identified several deficiencies in the electrical grounding of equipment carts (right) purchased from a reputable electrical manufacturer. The defective grounding of one of the carts resulted in a shock from ~60-V AC when an employee leaned against the cart while in contact with a well-grounded surface. An examination of the cart and all others like it at the APS identified improper grounding such as loose ground wiring, grounding to painted surfaces, and a butt-splice in ground wiring. These carts are on the list of items to be inspected by Designated Electrical Equipment Inspectors (DEEIs). Since the carts were from a reputable manufacturer whose equipment is mostly Underwriter’s Laboratory (UL) approved, the carts were considered to have a low risk probability. Inspections were not scheduled for the carts until the more difficult or higher risk items were to be completed. These carts were purchased in the early 1990s. Had they arrived within the past four years, they would have been inspected before going into service.

This incident emphasizes the need for ongoing DEEI inspection of items that have not undergone testing and certification from a nationally recognized testing lab such as UL.

Investigation of the second incident identified defective heat tape (right) as the direct cause of the short circuit electrical arc that damaged the waterline. The investigation also identified lapses in general-user understanding of APS electrical training, what a qualified electrical worker is, and what a non-qualified employee is and is not allowed to do. Heat tape can undergo some rough handling in its use. It is wrapped, unwrapped, coiled, pulled, and pushed during its application. Damage can occur from handling and from age. A thorough visual inspection should be performed prior to use of heat tape. This did not occur before the incident.

Following the identification of damage to the waterline, two student users (who are not Argonne-qualified electrical workers) repaired the tape and put it back into service. Investigation revealed that the user training provided the requisite information, which would have precluded the incident occurring. However, the two graduate students did not recall the contents even though it had been less than two years since they had taken the course. The investigation also noted that the student users were focused more on recovering from the short and water leak than on following APS notification and safety requirements.

These two events should reinforce our need for diligence when working with all types of electrical equipment.