

## Electric shock injures SN lineman

**A** report into the cause of an Oct. 2 electrical accident in the Sierra Nevada Region was released Nov. 1. Investigating team members determined that a lineman was shocked when he bridged two separate grounded systems of different voltage levels. Induced voltage at the worksite apparently caused the differences in voltage. The accident occurred on the Tracy-Ygnacio 69-kV transmission line in Oakley, Calif.

The Redding and Elverta crews were dismantling hardware on a pole, removing it and installing conductors on a newly erected pole. The report concluded the injured lineman placed himself in series with the grounded circuits, subjecting him to hazardous current.

The unconscious man was quickly lowered to the ground, revived and transported to Sutter Delta Hospital in Antioch, Calif.

The induced voltage was caused by other energized lines, which closely parallel the Tracy-Ygnacio 69-kV line. The incident and resulting investigation brought several important findings to light. The lineman in question, like others, did not fully under-

stand the risks of induced voltage.

Moreover, there is little guidance on the subject in Western safety manuals.

A de-energized line can become energized from induced voltage of a nearby energized circuit. The magnitude of the induced voltage depends on how many megawatts the energized line is carrying, the proximity of the two lines and the distance the lines run parallel. In short, if the parallel lines are close enough, the energized line can cause a hazardous current to flow on the de-energized line.

According to the accident report, "The victim might have bridged a voltage difference of 1,000 volts. The voltage difference between the established grounding system (the grounded guy wire) and the unbonded (unconnected) guy wire bracket was caused by the induced voltage conditions that existed at the worksite."

The root cause of the incident was a lack of understanding for the need to establish an equipotential zone at the work-site. In this case, guy wires and pole grounds should have been connected to the established grounding system.

The investigation team developed two judgments of need:

- ◆ Management must ensure Western employees adequately understand the induced voltage effects and the hazards that may be imposed on working personnel, if the hazards are not mitigated.
- ◆ Western must include language in its safety documents to clearly address the need to establish an equipotential zone at the worksite.

"Based on what we learned from this accident, we will improve our training program to ensure employees are well-versed in safe grounding and bonding procedures. We'll also modify our safety manuals to provide a clear picture of the dangers of induced voltage and the proper steps needed to avoid it," explained **Terry Dembrowski**, Western's safety manager. "It's fortunate we can learn from this event and take steps to prevent recurrences." ❏

*Positioning of equipment and victim when an accident occurred on Oct. 2, 2000. (Illustration by Connie Edwards.)*

