

NATF Redacted Operating Experience Report

Electrician Enters Minimum Approach Distance on 230 kV Circuit

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Topic

Electrician Enters Minimum Approach Distance on 230 kV Circuit

Description

An electrician entered the minimum approach distance on a 230 kV circuit that had been cleared for construction work in the station. A construction helper noticed that the portable protective grounds were not in place and initiated getting the electrician in the clear. This good catch on the part of the crew potentially prevented an electrocution. This action should be celebrated in addition to the critical deeper assessment into how the organization was reliant on the last line of defense to prevent a serious injury or fatality.

The incident included elements of human error, process drift, failed barriers, and organizational systemic drivers that, if not corrected, could result in the same or similar types of incidents. It was determined that escorts for non-permitted workers are rigidly applied to the control house; however, they are not rigidly applied within the energized substation yard. Evidence of this was found in both construction and maintenance activities.

Lessons Learned

1. Reliance on supplemental labor contractors resulted in unintended consequences and additional burden on company crews.
2. Process drift (for grounding processes) was discovered (use of locks and blocks, personal protection grounds, and statics grounds) in both maintenance and construction activities.
 - a. The need for locks and block usage in maintenance activities occurs more frequently, reducing drift.
 - b. Process drift for grounding practices may not be limited to construction.
3. Company escorting requirements and application intended to protect unqualified persons are not rigidly applied in the energized yard and not consistently considered when staffing construction crews.

Actions Taken

1. Assessment of contractor process deficiencies and risk is underway. Prior to this incident, a team of subject-matter experts was appointed with support of a project manager to highlight challenges and deficiencies in current practices with onboarding supplemental labor and project contractors. The team plans to identify risks, including the onboarding of contractors, and propose mitigations to senior leadership upon completion of the project.
2. Creating a policy and distributing expectations within construction and maintenance groups for permit requirements when using newly onboarded contractor supplemental labor electricians and electrical workers. This would include contractors being permitted within identified days/months of onboarding.
3. Developing a consistent demonstration/verification process for qualified persons and company contracting processes for selection of contractors. This would give acceptable criteria for (a) minimum

qualifications and experience; (b) demonstration of qualifications and experience through resume review, technical onboarding interview, and demonstration of skills; and (c) ensuring critical identified safety training is received within 30 days of onboarding.

4. Determine process for evenly distributing contract supplemental labor. Identify crews with high contractor ratios and adjust to reduce training burden on crews.
5. Finalize and implement an electrician trainee program.
6. Incorporate drift prevention and detection elements into a safety job observation program.

Extent of Condition

The team evaluated the extent to which the same or a similar problem exists in other equipment, products, processes, or human performance. If risk is discovered with a cause, a “same- similar” extent of cause is warranted looking into how broad the risk is present.

Cause Evaluated

Construction currently has a lack of resources that can be rapidly deployed for workload within energized substations.

Extent of Cause Conclusion and Basis

The construction crew involved in this incident was made up of the following personnel:

- 3 - Journeyman Electricians
- 4 - Contract Journeyman Electricians (with ~ 2-3 months experience working in the system)
- 1 - Electrician Foreman 1
- 1 - Electrician Foreman 3

Counting the two foremen, this crew was made up of 44% inexperienced contractors. On the day of the event, the seven construction crews were staffed with electricians (including FM1 and FM3).

Cause Evaluated

Drift present in safety-watching processes while working under a clearance. Lack of formality in assignment, start, and stop of activities while working under clearances and where multiple qualified electrical workers are present.

Extent of Cause Conclusion and Basis

Presence of drift in safety-watching formality, assignment, start, and stop in both construction and maintenance activities are evidenced by conversations with both construction and maintenance electricians as well as recent safety job observation reports and recent near hits received (2018-2019).

Condition Evaluated

Presence of drift in grounding processes (use of locks and blocks, PPGs, and statics grounds) in both maintenance and construction activities.

Extent of Condition Conclusion and Basis

The presence of drift in grounding processes was noted in construction through discussion with crews. The need for locks and block usage in maintenance activities occurs more frequently, reducing drift. The conclusion for presence of drift in some grounding practices may not be limited to construction, however, and is evidenced by discussion regarding the safety rules and unclear language that is in the rule (i.e., expectations).

Cause Evaluated

Escorting requirements and application intended to protect unqualified persons are not rigidly applied in the energized yard and not consistently considered when staffing construction crews for workload.

Extent of Cause Conclusion and Basis

Discussion with both construction and maintenance personnel indicated presence of drift in both activities. Escorting practice is rigid within the security perimeter but more relaxed in the substation yard.