

NATF Redacted Operating Experience Report

Safety Incident during the Removal of 230 kV Bushing

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Topic

Safety Incident during the Removal of 230 kV Bushing

Description

A contract employee was working to remove the bottom connections of a failed 230 kV bushing inside a 500/230 kV single-phase autotransformer. As he began to loosen the bolts on the bottom tap of the bushing, the rod slid out of the bushing housing and dropped approximately four feet, striking the top of the winding. The contract employee was positioned such that he was out of the line of fire.

The initial failure of the bushing appeared to be external in nature. Inspection of the bushing led crews to believe the four-hole pad termination and head of the bushing (top external portions of the bushing) to be the only items damaged:

- Previous experience from bushing failures as well as visual inspection led crew to the conclusion that the bushing was intact internally.
- The autotransformer had been worked on days prior to create isolation; the oil was drained, and the autotransformer was lifted and skidded approximately 200' to a safe location prior to the confined-space entry.

Insulator part of the bushing being supported by the bushing rod after it had fallen



View inside tank of fallen lower bushing.



Lessons Learned

1. Equipment that has failed should be treated as such, with extra precautions taken to ensure the entire device is secured prior to working on it.
2. Always assess the situation with uncertainty and question the “what ifs” that could occur.
3. Use of human performance tools (self-check, peer-check, and questioning attitude) contributed to body positioning and complacency about working with equipment.
4. Hazard wheel identification of gravity and motion aided in positioning and working with the equipment.

Actions Taken

1. Crews stood down to discuss the incident.
2. Steps were taken to make the site safe overnight.
3. Contacted bushing subject-matter experts (both external and internal) to discuss the incident and possible solutions for working with failed bushings.

Plant / Work Group Specific Actions

1. Held a safety stand-down with all personnel at the site.
2. Secured the top of bushing that remained on top of the autotransformer.
3. Communicated and discussed incident with the leadership team.

Extent of Condition

Performed an extent of condition assessment for storm-related work and found no other jobs with similar scope being executed.