

Primary Interest Groups

Generator Owners (GO), Generator Operators (GOP), Transmission Owners (TO), Transmission Operators (TOP)

Overview

The failure of a generator step-up transformer high-side disconnect phase connection caused the generator to be taken off line.

Details

An Entity reported a generator step-up transformer high-side disconnect phase connection started to arc. The plant control room was notified immediately and operations manually tripped the turbine and took the generator off line. It was found that the arc originated toward the pivot point of the switch just inside the contact region. The disconnect switch did not arc in the contact area of the switch. Once electricians removed the disconnect switch arm it was found to be full of ice. Water ingress in the disconnect arm froze during the cold weather causing the weld on the end of the arm to crack, which reduced the current carrying capabilities of the arm. This added heat to the area, which progressed to an arc.



Corrective Actions

To prevent reoccurrence, all three disconnect switch arms were replaced. The transformer side contacts were replaced as well as the corona ring between the contacts and the insulators and the bottom corona ring. Each contact was verified for proper contact with a visual inspection

and an electrical test. The insulators on the transformer side connection were tested. The insulators on the center pivot, which supports the switch arm, were also tested. Research of available industry technical documentation and did not find any documentation on similar occurrences. The Entity contacted the manufacturer, who also had not seen this type of failure. The manufacturer recommended drilling holes into the switch arm to eliminate water collection.

Lessons Learned

All plant electrical disconnect equipment should be inspected for areas where water could collect and freeze – especially in geographic areas not accustomed to freezing temperatures. Any areas found with the potential to retain moisture should be modified as prescribed by equipment manufacturer or an engineered design.

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