Safety Advice 10-2003 (NZ)

WAIRAKEI 220kV SWITCHGEAR REFURBISHMENT ACCIDENT

BACKGROUND

The accident occurred when a conductor was disconnected between a line trap and CVT (where temporary earths had been applied) which resulted in the out of service 220kV transmission circuit connected to the line trap becoming unearthed. The employee suffered electrical burns when he came in contact with the unearthed line trap/transmission circuit.

INITIAL ACCIDENT DESCRIPTION

On the morning of 1st July 2003, the 220kV circuit between Wairakei and Whirinaki was taken out of service. This circuit shares the same towers as the Wairakei Redclyffe circuit which remained in service. The contractor applied temporary earths at the boundaries of the work area, including one on the line CVT. An assurance was obtained from Whirinaki that the circuit was isolated and earthed at that end. The contractor's maintenance switcher then issued an access permit to the work party.

A number of teams within the work party then proceeded to replace copper conductor, old insulators and disconnectors, this included the line disconnector and earthswitch. One team was to replace the insulators supporting the line trap. In order to carry this out, the connection on the top terminal lug of the line trap had to be removed. Conductors from the terminal span and CVT were connected to the line trap top terminal. A temporary earth had been placed on the CVT as part of the isolation for the access permit. The intention was that the four bolts on the top terminal lug adjacent to the line trap were to be removed which would maintain the connection of the dropper from the terminal span to the CVT and earth.

An employee climbed a ladder and proceeded to disconnect the conductor connected to the CVT instead of the four bolts adjacent to the line trap. When separating this conductor from the line trap he disconnected the circuit earth path.

The above photo shows the ladder in position with the conductor to CVT removed. In addition to the temporary earth shown on the CVT (applied as part of the issuing of the access permit), an additional temporary earth was placed on the line side of the line trap after the incident in order to restore the earth path and facilitate safe rescue.

INITIAL LOSS DESCRIPTION

The accident resulted in the employee receiving electrical burns to both his left and right hands. He fell unconscious but was supported by his harness. He regained consciousness shortly after. A rescuer who held onto the line trap terminal lug while attempting to support him also received an electric shock, but did not sustain any injuries.

After a temporary earth was applied to the dropper from the terminal span, the employee was lowered to the ground by hiab and medical treatment provided. He is presently in hospital.

APPARENT CAUSE

Failure to recognise that the action being taken would effectively remove the temporary earth from the out of service circuit and expose the line trap to hazardous voltage.

RECOMMENDATIONS

- ***Hazard I D***
  Reinforce employee awareness that hazardous voltages can be present on out of service transmission lines even if the line is earthed at one end (refer Rule 601 d).

- ***Hazard Control***
  Ensure that temporary earths are placed in such a way that there is no risk that any work activity can interfere with the intended safety measure (in this instance work activity that interrupted earth continuity) (refer Rule 602 k ii).