Certified Test Report

Two Position Loadbreak Switch used in a 46 kV 65A Application

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CERTIFICATION

Statements made and data shown are, to the best of our knowledge and belief, correct and within the usual limits of commercial testing practice.

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History

A customer inquiry was received regarding the potential for use of the 38 kV switch at 46 kV. This application would also require a 250 kV BIL rating. To assess the capability of the 38 kV switch in a 46 kV, 250 kV BIL application, it was necessary to perform the following tests.

Object

Evaluate the performance of our standard switches in this special application, specially constructed of standard parts for high voltage endurance.

Test Procedures

A. Impulse

Test in closed position, with positive and negative impulses, energizing decks A and C, grounding tank and deck B, to 230, 240 and 250 kV BIL.

B. AC Withstand

Test, connected as above, to 75, 80, 85, 90 and 95 kV for 1 minute.

C. Load Switching

Test per ANSI/IEEE C37.71 (1984) and C37.72 (1987) using 65 Amps as the full current value at 46 kV and 12 kA as the fault current value.

Test Results

Switch passed 250 kV BIL, both positive and negative, phase-to-phase and phase-to-ground.

Switch passed 95 kV AC for 1 minute both positive and negative, phase-to-phase and phase-to-ground.

Switch passed switching at 46 kV using currents of 65 Amps (20 each, openings and closings), 30 Amps (30 each, openings and closings), 16 Amps (10 each, openings and closings).

Switch passed magnetizing current switching at 18 Amps (10 each, openings and closings).

Switch passed cable charging current tests at 18 Amps (20 each, openings and closings). The 18 Amps was the maximum capacity, at 46 kV RMS, of the available equipment.

Oil samples at this point showed no significant deterioration in dielectric strength or power factor and an inspection of the contacts revealed no deterioration. Operating torque was unchanged.

Switch passed 50 no-electrical-load open-close cycles without changes in operating torque.

Switch passed 12,000 Amp momentary current shots (three sets of three 15 cycle shots, randomly timed). The maximum opening torque following the momentary series was 35 foot-pounds.

Switch passed 12,000 Amp, 15 kV make and latch tests (three closings held for 15 cycles). (Equipment limitations prevented using 46 kV in this test.) The maximum opening torque following close and latch tests was 27 foot-pounds.

Discussion

The switch passed the high voltage tests, due to the corresponding drop in current. The wear on the contacts was much less than typically seen in 300A/38 kV or 400A/28 kV testing. Arcing was limited to about 1.25 cycles, in the worst case oscillogram.

Conclusion

The switch configured for this test passes the critical requirements for a 46 kV, 65A, 250 kV BIL class II distribution transformer. This specially constructed switch will be given the part number 2238000C46M.

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