

# Switchgears

the DayCor® solution for indoors

- >> Reveal inadequate design
- >> Reveal missing components
- >> Reveal wrong hardware installations
- >> Reveal mismatching components
- >> Pinpoint failures
- >> Find damaged mistreated components
- >> Check thoroughly periodically
- >> Avoid hazardous situations
- >> Establish a baseline for regular testing

Switchgears are used to protect, isolate and route power circuits. Switchgears are divided into the four groups: disconnect or isolator switches, load break switches, circuit breakers, and contactors. Indoor disconnects and indoor breakers are typically mounted in metal switchgear enclosures. Medium voltage switchgears are the core elements of electrical networks and of industrial users. In catastrophic occurrences their failure may have a significant impact on power availability.

## Corona in Switchgear Cabinets

The destructive nature of corona makes it a serious consideration in metal clad switchgears. Moreover, corona causes most of the flashovers occurrences and explosion.

Corona within switchgear cabinets is created due to electrical breakdown of air resulting from ionization processes of gases that are triggered by local high electrical stress.

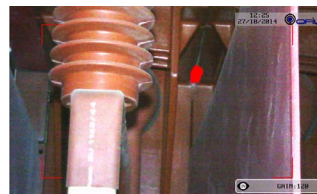
The main factors that lead to local electrical stress are: Geometric, Spatial and Environmental conditions.

Once corona is triggered it deposits a conductive tracking path and a cloudy dusty air. If a pathway is created between phases or between the conductive layer/air to ground flashover happens.



## Cost Effective Solution

DayCor® Scalar camera promptly pinpoints and displays corona partial discharge emitting sources, and thereby reduces labor costs, assists eliminate bad workmanship, leads to extended component life time, supports system reliability, assists maintaining companies' reputation.



Corona due to bad design



Corona in Circuit Breaker

**Corona emits ultraviolet radiation that can be detected and visualized by DayCor® UV imagers**

# Switchgears

the DayCor® solution for indoors

## Case Study

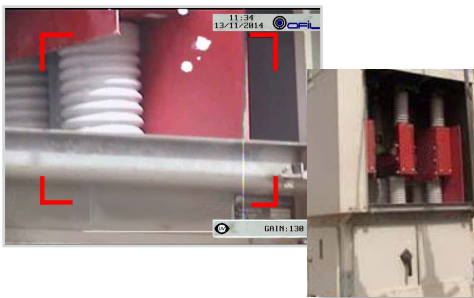
Tripping circuit breaker, air insulated in metal clad cabinet, 161 kV substation

Equipment: DayCor® Scalar

Diagnostic duration: 5 min

Chronology:

- Tripping from one of the cabinets was reported
- Noise was heard from the cabinet
- Maintenance team opened the circuit breaker's metal cabinet
- Material degradation was observed with naked eyes
- **DayCor® camera pinpointed the corona source** in the interface between the epoxy insulating plates
- Tracking was observed on the epoxy board



Diagnosis:

- A design failure: sharp edges on the epoxy dividers
- Air gap between the boards and 2 phases

Solutions:

- Cabinet redesigned



Ofil's DayCor® Scalar is the most suitable solution to inspect switchgear cabinets. Scalar can pinpoint the exact location of the emission and focus on the problem. With its special outstanding features:

mode of operation, powerful led flashlight, wide-field-of-view, marco recording of both video clips and images, large display, extended battery operating duration and more make Scalar a first choice testing equipment.

## Case Study

Sharp Chlorine Smell from a Refurbished Trafo

Equipment: DayCor® Scalar



Chronology:

- Generator failed causing outage and massive loss of over \$100K
- Main TRAFO station was neutralized & cleaned
- A sharp smell of chlorine
- DayCor® detected corona activity, that created the chlorine smell, on the connections between bus bar and insulating plates adjacent phases
- Tracking observed on the inner plates

Diagnosis:

- When treated the TRAFO insulating material was wiped creating local electrical stress

Solutions:

- High voltage insulating paint was re-applied