

Infrared thermography detects potentially unsafe, costly bushing hot spot

SDMyers utilizes infrared (IR) scanning, an effective complementary analytical method, to help a New York-based industrial customer identify a faulty, high voltage connection and complete a safe, scheduled replacement.

CHALLENGE

An SDMyers industrial customer located in New York was diligent about annual transformer inspections and sampling. This customer was aware that, although transformer liquid testing and analysis is a robust and critical component of substation reliability, it is not exhaustive in terms of fault detection. Understanding these small but inherent limitations and prioritizing a proactive maintenance budget, the customer was looking for a more comprehensive approach.

SOLUTION

To implement a means for uncovering additional failure modes, SDMyers suggested IR scanning at the time of liquid sampling. The thermal images, when analyzed in conjunction with the routine liquid sample test results, would provide a clearer indication of asset condition.

When the thermographer performed the IR inspection, he found deficiencies not evident during the visual inspection. The IR images showed that one of the A side loadbreaks was experiencing a significant temperature difference of 19°C when compared to the other phases. Dissolved gas analysis (DGA) confirmed the IR thermography findings by showing high levels of ethylene and acetylene in the dielectric liquid, indicating the high temperature was potentially affecting the internal connection. SDMyers recommended monitoring the connection moving forward. However, the following year, IR thermography revealed that the hot spot had persisted, along with elevated levels of dissolved gas.



A SIDE BUSHING — A COMPARISON OF CONVENTIONAL PHOTOGRAPHY AND A THERMAL IMAGE SHOWING A DELTA OF 19.3°C BETWEEN SP1 (46.3°C) AND AR1 (27.0°C).

OUTCOME

After completing a cost analysis on field repair versus replacement, replacing the transformer emerged as the better solution for this customer. SDMyers continued with liquid sampling and IR scanning to monitor the loadbreak and bushing while planning and procurement were underway. The IR scanning, combined with the liquid test data and ongoing monitoring, allowed the customer to:

- Gain the desired visibility into failure modes not captured by DGA
- Avoid a potential safety incident by raising awareness of the issue
- Schedule a replacement to eliminate unplanned downtime caused by a failure