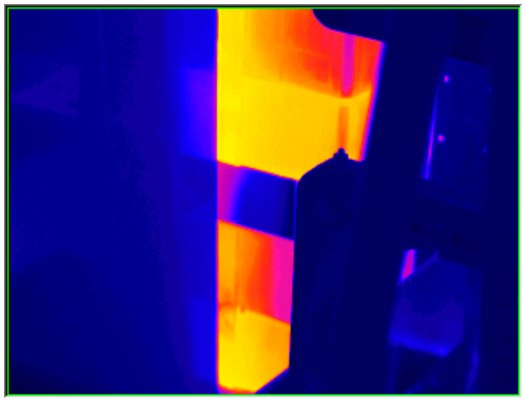
IRTN

Infrared TechNote

# Commissioning of new switchgear



The pictures below and the exception described in TechNote 1 ("The hot one is not always the culprit") are good arguments for performing infrared inspections on newly installed switchgear as soon as sufficient load has been placed on it to cause heating of bad connections.



The infrared image to the left is a picture of the bus connection between two main switchgear cabinets. We are looking at this from the back. The cabinet on the left contains the 2,000 amp, 480 volt main breaker. The cabinet to the right, from which we are viewing the connection, houses the feeder breakers. The bus in each cabinet is parallel six inch aluminum. The dog-leg inter-cabinet connections are four 3 inch aluminum sections per phase. What was observed was that two of the phases were hot and the third phase and the neutral were cool. The temperature rise was 80°F. The load on the switchgear was about half of rated capacity.

Upon removing the front covers for repair, we discovered that the bolts on the two hot phases were loose. The bolts on the other buses were tight. The picture on the left shows the connection of one of the buses from the front. Note particularly the second bolt down. Because of arcing and heat, the nut had welded to the bolt and the bolt had to be broken to remove it. The bottom picture shows the inside face of one of the dog-leg sections. Note the discoloration around the bolt hole. This is where the dog-leg had welded to the bus. A chisel had to be used to separate the connection. The cost of the repair for these connections was in excess of $8,000.

We have seen enough of these situations where connections were not properly tightened during installation that we strongly urge industries to have their switchgear commissioned with an infrared inspection before fully accepting it.

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