



THE BRANCH OF RZHD, JSC
TRANSENERGO

STRUCTURAL UNIT
NORTHERN ENERGY SUPPLY DIRECTORATE

STRUCTURAL UNIT
YAROSLAVL POWER SUPPLY DISTANCE

ELECTROTECHNICAL LABORATORY

43 Uglichskaya St., Yaroslavl, 150031
Tel.: +7 (4852) 79-35-93, fax: +7 (4852) 79-20-01
E-mail: nee-eti@nrr.rzd

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На № _____ от _____

ATTN: O.N. Ekaterinina
Director General
of SKB EP, LLC

Review to the use of the devices

Dear Olga Nikolaevna!

To date, the following devices are in operation in the electrotechnical laboratory of the Yaroslavl Power Supply Distance of the Northern Energy Supply Directorate: MIKO-2.3, MIKO-7, PKR-1 and PKV/M7.

These devices are used in conducting a comprehensive survey of electrical equipment of substations, such as power and converter transformers, high-voltage circuit breakers, and disconnectors. During the tests, SKB EP devices gave a good account of their reliability, stability of operation, and ease of use. When using the above-mentioned devices, total measurement time was reduced.

The use of PKR-1 OLTC analyzer made it possible to more accurately determine the defects of the power transformer and tap changing device during a comprehensive check-up. The most frequently diagnosed damages are burning and adjustment of the contactor contacts of the tap changing device. The second most common defect is the burning of circuit breaker contacts. One of these defects was confirmed by the visual inspection.

The use of MIKO-2.3 and MIKO-7 devices that are dedicated to the resistance measurement in inductive circuits gave the greatest reduce of measurement time. When using an AC bridge, one resistance measurement

of the 110 kV transformer winding lasted about 1.5 minutes. When using MIKO-2.3 or MIKO-7 devices, the time spent on one measurement was reduced to 30 seconds.

PKV/M7 circuit breaker analyzer is used for a comprehensive assessment of the state of high-voltage circuit breakers. As the main direction was chosen the assessment of SF6 circuit breakers of MKP-110 type. There is a big survey conducted of SF6 circuit breakers installed instead of oil circuit breakers. The use of PKV/M7 circuit breaker analyzer has reduced the time spent on the diagnostics of circuit breakers, and increased the accuracy of the data obtained. Previously, the measurements of the moving parts movement and compression were controlled by a ruler with oil drained from the circuit breaker tank. PKV/M7 circuit breaker analyzer is, first of all, more comfortable to use and has better accuracy comparing to the previously used methods.

Having experience in the operation of SKB EP devices since 2016, we can definitely recommend the use of these devices for diagnostics of energy facilities.

Head of the laboratory

A handwritten signature in blue ink, consisting of a large, stylized initial 'S' followed by a vertical line and a horizontal stroke at the bottom.

S.A. Perfiliev