



IRKUTSKENERGO

ENERGY AND COAL COMPANY

**IRKUTSK PUBLIC JOINT-STOCK COMPANY OF ENERGY AND ELECTRIFICATION
(PAO IRKUTSKENERGO)**

IRKUTSK HPP, BRANCH

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

**664033, Irkutsk,
Lermontov Str., 130, Off. 226**

Re: Reference on operation of the SKB EP Company instruments

Dear Olga Nikolaevna,

Specialists of Irkutsk HPP (hydro power plant) have been using the SKB EP instruments for several years. The PKV/M7 instruments were used for measuring time characteristics of moving parts of such circuit breakers as ABB HGI-3 (13.8 kV), AREVA HGF-1012 (110 kV), SIEMENS 3AP1DT-145 (110 kV, 220 kV), and 3AP1DT-245 (220 kV); the MIKO-2.3 and MIKO-7 instruments are used on electric motors (0.4 kV) and disconnecting devices RVR(Z)-20/2000 M-U3, RGNP-110/2000-50UHL1, RDZ-1-110-2000UHL1, and RNDZ-220/2000U1 (13.8/110/220 kV).

PKV/M7 instrument meets all our needs in HV circuit breaker diagnosis. It provides convenient control of poles time difference using the PC software that shows defects in a circuit breaker long before they may cause a heavy failure.

MIKO-2.3 low / high resistance meter provides quick output of the results of measurements; it is a universal instrument that integrates four modes in one. The instrument is rather convenient and mobile.

MIKO-7 milli-ohmmeter in the course of operation proved to be rather efficient. The instrument has a robust shock-proof housing that "saved" the instrument many times.

The updated software of the milli-ohmmeter allowed us to save time and eliminate personnel's mistakes. When we used a voltampermetre we had to carry several instruments, and a battery; their assembly took time, and measurements on a transformer took two hours minimum. Time of measurements using the MIKO-7 is halved or even makes one third of that.

Benefits of the PKV/M7 include: information on the results of measurements and ability to operate the circuit breaker from the instrument. The MIKO-2.3 is rather mobile and operative; the MIKO-7 has a large set of functions and automatic mode of operation.

During the SKB EP instruments operation on the main electric equipment of the plant we did not face any problems, the instruments worked properly, without failures. On the auxiliary equipment the problems with electric motors were timely revealed (inter-winding short circuit, break of windings end).

Specialists of Irkutsk HPP recommend the PKV/M7, MIKO-2.3 and MIKO-7 to all the companies as they are cost-effective analogues of the instruments of foreign manufacture.

Head of Electric Equipment Operation Department

O.N. Kosyanenko