3.19. LABORATORIES FOR POWER CABLE DIAGNOSTICS

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Evaluation of the state of cable line insulation and fittings is of utmost importance in order to decide whether to continue operation, to repair or to replace cable lines.

The state of power cable insulation state can be determined by the following methods:

– testing by increased voltage under applicable standards;

– one-time testing under diagnostic methods (diagnostics.

From experience of operation of high-voltage cable lines, it is known that positive results of increased voltage testing do not guarantee at all the subsequent accident-free operation of power cables. Thus, for example, following successful increased voltage tests of cable lines, failures occur often within the nearest next months. It is established that it is caused by intensive destruction of insulation by partial discharges in the problematic points leading to reduction of cable line service life. Tests by increased voltage for cable lines with long service life or low quality of mounting having already high level of partial discharges in problematic points are the most dangerous ones.

Objective data on the technical state of power cables can be obtained by modern diagnostic methods implemented in the form of a diagnostic laboratory for power cables.

This laboratory is intended for evaluation of the following:

– cable line state;

– condition and mounting quality of straight joints and sealing ends;

– quality of compliance with technology of cable line installation.

Diagnostics is divided into two types:

– integral diagnostics using the method of return voltage measurement for cables with paper-oil insulation and the relaxation current method for cables with insulation of cross-linked polyethylene/polyethylene;

– local diagnostics using the method of partial discharge for cables with insulation of any type.

Diagnostics of power cables allows the following:

– To reveal in timely manner the problematic point in a cable, which make it possible to pass from scheduled preventive maintenance to repairs related with technical state;

– To obtain realistic picture of the cable line state allowing maintenance of cable conditioning;

– To control the quality of cable installation during acceptance procedures;

– To measure dangerous levels of partial discharges;

– To evaluate the insulation humidity.