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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

DL 400-1991

Replacing DL/T 400-2010

**Technical guide for live working in 500kV AC compact
transmission line
(English Translation)**

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Foreword

This standard is based on the rules given in GB/T 1.1-2009 "Guidelines for Standardization Part 1: Structure and Compilation of Standard Compilation" grass.

This standard is a revision of DL/T 400-2010 "Technical Guidelines for Live Working on 500kV AC Compact Transmission Lines", and is in line with DL/T the main changes from 400-2010 are as follows.

--Extend the scope of application to single and double-circuit 500kV AC compact lines in areas of 3000m and below;

--Increase the technical requirements for one-time live operation and another stoppage of the power line;

This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction of the National Technical Committee for Standardization of Live Work.

The main drafting organizations of this standard. China Electric Power Research Institute Co., Ltd., State Grid Zhejiang Electric Power Co., Ltd. Jinhua Power Supply Company, Grid Shandong Electric Power Company, State Grid Jiangsu Electric Power Co., Ltd., State Grid Hubei Electric Power Co., Ltd.

1 Scope

This standard specifies the technical requirements for live working of 500kV AC compact transmission lines, the test, transportation and protection of in and out equipotential and tools.

Tube and so on.

This standard applies to live work on 500kV single and double-circuit AC compact transmission lines at an altitude of 3000m and below.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article. For undated references, the latest version (including all amendments) applies to this document.

GB/T 2900.55 Electrician Terminology Live Work GB/T 6568 Shielding clothing for live working GB/T 13035 Insulated rope for live working GB 13398 Hollow insulating pipe, foam-filled insulating pipe and solid insulating rod for live working GB/T 14286 Terminology for live working tools and equipment GB/T 18037 Basic technical requirements and design guidelines for live working tools GB 26164.3 Safety Work Rules for the Electric Industry Part 3: Power Lines DL 409 Electrical Safety Work Regulations (Part of Power Lines) DL/T 463 Insulator clamp for live working DL/T 876 Insulation coordination guidelines for live working DL/T 878 Test guidelines for insulating tools for live working DL/T 974 Tool warehouse for live working DL/T 976 Preventive test procedures for live working tools, devices and equipment

3 Terms and definitions

The following terms and definitions defined by GB/T 2900.55 and GB/T 14286 apply to this document.

Live working with protective gap Install protective gaps between adjacent poles and towers at the working point to limit live maintenance after overvoltage at the working point.

4.1 Personnel requirements

4.1.1

Live workers should be healthy and free from physical and psychological obstacles that hinder the work.

4.1.2

Live working personnel should have basic knowledge of electrician principles, master the basic principles and operation methods of live working, and be familiar with working

workers the scope of application and method of use of the appliance. Should master the emergency rescue method, especially electric shock first aid.

4.1.3

Live working personnel should pass special training, pass the examination and have a job certificate.

4.1.4

The person in charge of the work (or guardian) should have more than 3 years of actual working experience in live work on transmission lines with a voltage level of 500kV and above.

Be familiar with equipment conditions, and have certain organizational capabilities and accident handling capabilities.

4.2 System requirements

It should be implemented in accordance with the provisions of GB 26164.3, DL 409 and related systems.

4.3 Meteorological conditions

4.3.1

The operation should be carried out in good weather. In case of thunder, rain, snow, or heavy fog, no live work should be carried out. The wind is greater than 10m/s (5 Level), it is not suitable for operation. When the wind force is greater than 8m/s (level 4), it is not suitable to work in alternate phases.

4.3.2

When the relative humidity is greater than 80%, if live work is required, insulating tools with moisture-proof performance should be used.

4.3.3

Under special or emergency conditions, if live repairs must be carried out, the person in charge of the work shall organize the Relevant personnel fully discuss and formulate reliable organizational, safety, and technical measures, which can only be carried out after approval.

4.3.4

If there is a sudden change in weather during live work, which may endanger the safety of people or equipment, stop work immediately.

In the case of personal safety, restore the normal condition of the equipment as soon as possible, or take other measures.

4.4 Other requirements

4.4.1

For more complex and difficult new projects and new tools developed for live work, scientific tests should be conducted to confirm safety and reliability.

Prepare safety measures and operating process plans, and use them after approval.

4.4.2

The person in charge of live work should get in touch with the on-duty control staff before starting the work, and then start the work. When the automatic reclosing device is disabled, the permitting procedures shall be performed. After the work is over, report to the on-duty control staff in time. It is strictly prohibited to deactivate or resume Double reclosing.

5.1 Maximum overvoltage multiple

For live work on 500kV AC compact lines, the minimum safety distance and minimum safety distance for live work must be determined according to the maximum overvoltage multiple during work.

The minimum effective length of the combined gap and insulation tool. The maximum overvoltage multiple can be calculated according to the system parameters, if you don't know the exact overvoltage Multiplier, the appropriate operating gap should be selected according to the maximum overvoltage multiple (2.18pu) that may occur in the 500kV system.

5.2 Ground potential work

5.2.1

When working at ground potential, the minimum safe distance between the ground potential operator on the tower and the charged body shall not be less than the provisions in Table 1.

Note: The values in the table do not include the space occupied by the human body, and the space occupied by the human body should not be less than 0.5m during operation.

5.2.2

The minimum effective insulation length of insulating tools and appliances should meet the requirements of Table 2.

5.3 Equipotential work

5.3.1

When the operator enters and exits the equipotential through insulated tools, the minimum