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TECHNICAL REPORT

Reliability and availability evaluation of HVDC systems

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

RELIABILITY AND AVAILABILITY EVALUATION OF HVDC SYSTEMS

FOREWORD

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IEC TR 62672, which is a Technical Report, has been prepared by IEC technical committee 115: High Voltage Direct Current (HVDC) transmission for DC voltages above 100 kV.

This first edition cancels and replaces the first edition of IEC 62672-1 published in 2013. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) HVDC stations with voltage sourced converters have been included;
- b) this document has been aligned with latest Cigré TB 590:2014, which has superseded the previous Cigré TB 346:2008.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
115/177/DTR	115/185/RVDTR

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

RELIABILITY AND AVAILABILITY EVALUATION OF HVDC SYSTEMS

1 Scope

This document applies to all line-commutated and voltage-sourced high-voltage direct current (HVDC) transmission systems used for power exchange in utility systems.

In order to assess the operational performance of HVDC transmission systems, reliability and availability are evaluated. The intention of the performance evaluation is to identify further design improvements. For this purpose the HVDC users/owners are encouraged to compile reports on an annual basis based on the recommendations given in this document. The purpose of this document is to define a standardized reporting protocol so that data collected from different HVDC transmission systems can be compared on an equitable basis. Such reports can be sent to Cigré SC B4, “HVDC and Power Electronics” (<http://b4.cigre.org>) which collects such data and publishes it in a survey of HVDC systems throughout the world on a bi-annual basis.

This document covers point-to-point transmission systems, back-to-back interconnections and multi-terminal transmission systems. For point-to-point systems and back-to-back interconnections, i.e. two-terminal systems, statistics are reported based on the total transmission capability from the sending end to the receiving end measured at a given point. If, however, the two terminals are operated by different users/owners, or are composed of equipment of a different vintage or of equipment from different suppliers, statistics can be reported on an individual station basis if so desired by those responsible for reporting. In such a case, the outage is only reported under the originating converter station, taking care not to report the same event twice. For multi-terminal systems, i.e. systems with more than two terminals, statistics are reported separately for each converter station based on its own individual capability.

Multi-terminal systems, incorporating parallel converters but having only two converter stations on the DC line, can be considered as either point-to-point systems or as multi-terminal systems for purpose of reporting. Therefore, statistics for this special type of multi-terminal system can be reported based on either total transmission capability or on individual station capability. If the converters at one station use different technology, converter station statistics can be reported separately for each different type of capacity if desired. Multiple bipoles are also reported individually. Special mention is given in the text and in the tabulations to any common events resulting in bipolar outages.

NOTE Usually the agreement between the purchaser and the turnkey suppliers of the HVDC converter station includes specific requirements regarding contractual evaluation. Such specific requirements will prevail over this document.

2 Normative references

There are no normative references in this document.