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Reliability and availability evaluation of HVDC systems – Part 1: HVDC systems with line commutated converters

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CONTENTS

FOREWORD 5
1 Scope 7
2 Normative references 7
3 Terms, definitions and abbreviations 8
3.1 Outage terms 8
3.2 Capacity terms 8
3.3 Outage duration terms 9
3.4 Time categories 9
3.5 Availability and utilization terms 10
3.6 Commutation failure performance terms 11
3.7 Abbreviations and symbols 11
4 Classification of HVDC transmission system equipment 12
4.1 General 12
4.2 AC and auxiliary equipment (AC-E) 12
4.2.1 General 12
4.2.2 AC filter and other reactive power equipment (AC-E.F) 13
4.2.3 AC control and protection (AC-E.CP) 13
4.2.4 Converter transformer (AC-E.TX) 13
4.2.5 Synchronous compensator (AC-E.SC) 13
4.2.6 Auxiliary equipment and auxiliary power (AC-E.AX) 13
4.2.7 Other AC switchyard equipment (AC-E.SW) 13
4.3 Valves (V) 14
4.3.1 General 14
4.3.2 Valve electrical (V.E) 14
4.3.3 Valve cooling (V.VC) 14
4.4 DC control and protection equipment (C-P) 14
4.4.1 General 14
4.4.2 Local control and protection (C-P.L) 14
4.4.3 Master control and protection (C-P.M) 14
4.4.4 Telecommunications equipment (C-P.T) 14
4.5 Primary DC equipment (DC-E) 15
4.5.1 General 15
4.5.2 DC filters (DC-E.F) 15
4.5.3 DC smoothing reactors (DC-E.SR) 15
4.5.4 DC switching equipment (DC-E.SW) 15
4.5.5 DC measuring equipment (DC-E.ME) 15
4.5.6 DC earth electrode (DC-E.GE) 15
4.5.7 DC earth electrode line (DC-E.EL) 15
4.5.8 Other DC switchyard and valve hall equipment (DC-E.O) 15
4.6 Other (O) 16
4.7 DC transmission line (TL) 16
4.7.1 General 16
4.7.2 DC overhead transmission line (TL-OH) 16
4.7.3 DC underground/submarine cable (TL-C) 16
4.8 External (EXT) 16
5 Classification and severity of fault events and restoration codes 16

5.1 Classification of fault events 16
5.2 Severity codes 17
5.3 Restoration codes 18
6 Instructions for compilation of report 18
6.1 General 18
6.2 General instructions 18
6.3 Instructions for Table 2 and Table 3 19
6.3.1 Section 1 19
6.3.2 Section 2 19
6.3.3 Sections 3, 4 and 5 19
6.3.4 Section 6 20
6.3.5 Section 7 20
6.4 Instructions for Table 4 and Table 5 23
6.4.1 Forced outages – Table 4 23
6.4.2 Scheduled outages – Table 5 23
6.5 Instructions for Table 6 25
6.6 Instructions for Table 7 26
6.7 Instructions for Table 8 26
6.8 Instructions for Table 9 27
7 Interpretation and evaluation of reports 28
7.1 Calculation of outage duration 28
7.2 External events 28
7.3 Protective operation 28
7.4 Performance of special controls 28
Annex A (informative) Outage log form and examples 30
A.1 Example of an outage log 30
A.2 Examples of application of rule f) of 6.3 scheduled outage during a forced outage 32
A.2.1 Case 1: Scheduled outage does not increase ODF or extends outage duration 32
A.2.2 Case 2: Scheduled outage increases ODF 33
A.3 Examples of application of rule g) of 6.3 second outage during an outage 34
A.3.1 Case 1: Second outage does not increase ODF or extends outage duration 34
A.3.2 Case 2: Second outage extends duration 35
A.3.3 Case 3: Second outage with variable ODF 36
Annex B (informative) Sample annual report 37
Bibliography 43

Figure A.1 – Scheduled outage does not increase ODF or extends outage duration 32
Figure A.2 – Scheduled outage increases ODF 33
Figure A.3 – Second outage does not increase ODF or extends outage duration 34
Figure A.4 – Second outage extends duration 35
Figure A.5 – Second outage with variable ODF 36

Table 1 – Classification of fault events 17
Table 2 – DC system performance for back-to-back systems and for two terminal systems reporting jointly (corresponding to Table 1 of Cigré TB 346:2008) 21

Table 3 – DC system performance for multi-terminal systems and for stations reporting separately as part of two-terminal systems (corresponding to Table 1 M/S of Cigré TB 346:2008) 22
Table 4 – Forced outages HVDC substation (corresponding to Table 2FS of Cigré TB 346:2008) 24
Table 5 – Scheduled outages HVDC substation (corresponding to Table 2 SS of Cigré TB 346:2008) 24
Table 6 – HVDC overhead line protection operations (corresponding to Table 3 of Cigré TB 346:2008) 25
Table 7 – AC system faults and commutation failure starts (back-to-back, two terminal or multi-terminal systems) (corresponding to Table 4 of Cigré TB 346:2008) 26
Table 8 – Converter unit hours and semiconductor devices failed (corresponding to Table 5 of Cigré TB 346:2008) 27
Table 9 – Forced outage summary (corresponding to Table 6 of Cigré TB 346:2008) 29
Table A.1 – Example of an outage log 30
Table B.1 – DC system performance for two terminal systems reporting jointly 37
Table B.2 – Forced outages HVDC substation 38
Table B.3 – Scheduled outages HVDC substation 39
Table B.4 – HVDC overhead line protection operations 40
Table B.5 – AC system faults and commutation failure starts 40
Table B.6 – Converter unit hours and semiconductor devices failed 41
Table B.7 – Forced outage summary 42

INTERNATIONAL ELECTROTECHNICAL COMMISSION

RELIABILITY AND AVAILABILITY EVALUATION OF HVDC SYSTEMS –

Part 1: HVDC systems with line commutated converters

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- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC/TS 62672-1, which is a technical specification, has been prepared by IEC technical committee 115: High voltage direct current (HVDC) transmission for DC voltages above 100 kV.

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

Enquiry draft	Report on voting
115/68/DTS	115/75/RVC

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

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

Annexes A and B are for information only.

A list of all parts in the IEC 62672 series, published under the general title *Reliability and availability evaluation of HVDC systems*, can be found on the IEC website.

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

- transformed into an International standard,
- 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 –

Part 1: HVDC systems with line commutated converters

1 Scope

This part of IEC 62672 applies to all line-commutated high-voltage direct current (HVDC) transmission systems used for power exchange in utility systems. HVDC stations with voltage sourced converters (VSC) are not covered.

In order to assess the operational performance of HVDC transmission systems, reliability and availability need to be evaluated. For this purpose the HVDC users/owners are encouraged to compile reports on an annual basis based on the recommendations given in this Technical Specification. The purpose of this part of IEC 62672 is to define a standardized reporting protocol so that data collected from different HVDC transmission systems can be compared on an equitable basis. It is recommended that such reports are sent to Cigré SC B4, "HVDC and Power Electronics" (http://b4.cigre.org) who collects such data and publishes a survey of HVDC systems throughout the world on a bi-annual basis.

This part of IEC 62672 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 to be 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 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 should only be reported under the originating converter station taking care not to report the same event twice. For distributed multi-terminal systems, i.e. systems with more than two terminals, statistics are to be 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 d.c. 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 to be reported individually. Special mention should be 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 govern over this Technical Specification.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60633:1998, *Terminology for high-voltage direct current (HVDC) transmission* Amendment 1:2009