

1 Q: Reference: *Review of Newfoundland and Labrador Hydro Power Supply*  
2 *Adequacy and Reliability Prior to and Post Muskrat Falls Final Report, August*  
3 *19, 2016, Page 77, Conclusion IV-17*  
4

5 Please confirm whether or not the referenced Cigre data of 0.24 bipole outages  
6 per year would include all the other causes listed in Points 2 and 3 of Conclusion  
7 IV-17, if they had caused a bipole outage to a Cigre reporting utility.  
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9

10 A. The Cigre definition of an outage is set out in section 3.1.1 of Cigre Technical  
11 Brochure 590 “Protocol for Reporting the Operational Performance of HVDC  
12 Transmission System (Line Commutated Converters and Voltage Sourced  
13 Converters)”, which reads as follows:  
14

15 *3.1.1 Outage - The state in which the HVDC System is unavailable for operation*  
16 *at its maximum continuous capacity due to an event directly related to the*  
17 *converter station equipment or dc transmission line is referred to as an outage.*  
18 *Failure of equipment not needed for power transmission shall not be considered*  
19 *as an outage for purposes of this report. AC system related outages will be*  
20 *recorded but not included in HVDC system reliability calculations. For purposes*  
21 *of this report, outages taken for major reconfiguration or upgrading such as*  
22 *addition of converters shall not be reported.*  
23

24 *3.1.2 Scheduled Outage - An outage, which is either planned or which can be*  
25 *deferred until a suitable time, is called a scheduled outage.*  
26

27 *Scheduled outages can be planned well in advance, primarily for preventive*  
28 *maintenance purposes such as annual maintenance program. During such*  
29 *planned maintenance outage, it is usual to work on several different*  
30 *equipment or systems concurrently. It is not necessary to allocate such*  
31 *outage time to individual equipment categories. Only the elapsed time*  
32 *should be reported in Table 2SS as “PM”.*  
33

34 *Classified under the scheduled outage category are also outages for work*  
35 *which could be postponed until a suitable time (usually night or weekend)*  
36 *but cannot be postponed until the next planned outage. Equipment category*  
37 *code in Table 2 SS should be used to identify the affected equipment. This*  
38 *includes discretionary outages based on operating policies, owner’s*  
39 *preference and maintenance of redundant equipment.*  
40

41 *Note: If the scheduled outage is extended due to additional work which*  
42 *would otherwise have necessitated a forced outage, the excess period is*  
43 *counted as a forced outage.*

1           3.1.3 *Forced Outage* - *The state in which an equipment is unavailable for normal*  
2           *operation but is not in the scheduled outage state is referred to as a forced*  
3           *outage.*

4           3.1.3.1 *Trips* - *Sudden interruption in transmission by automatic protective action*  
5           *or manual emergency shutdown.*

6  
7           3.1.3.2 *Other forced outages* - *In general other forced outages are unexpected*  
8           *HVDC equipment problems that force immediate reduction in capacity of HVDC*  
9           *stations or system but do not cause or require a trip. Also in this category are*  
10          *outages caused by start-up or de-block delays.*

11  
12          *Note: In some cases the opportunity exists during forced outages to perform some*  
13          *of the repairs or maintenance that would otherwise be performed during the next*  
14          *scheduled outage. See clause 5.2, rule (f).*

15  
16          Point 2, bullets a), b), c), and d) of Conclusion IV-17 would not be included as a  
17          forced outage for the purpose of reporting of an HVdc scheme's performance, since  
18          the direct cause is not the HVdc scheme.

19  
20          Point 2, bullet e) (operator errors) of Conclusion IV-17 are normally excluded from  
21          the Manufacturer's guarantee, but should be included in the reporting.

22  
23          Point 2, bullet f) (major fires) of Conclusion IV-17 are included in the reporting, but  
24          whilst they can cause extensive outage, they are very rare, and none of the schemes  
25          included in the reporting suffered a major fire.

26  
27          The outages mentioned in Point 3 of Conclusion IV-17 would be included in the  
28          reporting of an HVdc scheme's performance. However, none of the reporting HVdc  
29          schemes used as the basis for the 0.24 bipole outages per year included an HVdc  
30          switching station, and none of the schemes had an electrode line as long as the  
31          unusually long one used from the Muskrat Falls converter station.