

Q. With reference to pg. 13 of Exhibit 106, should the phrase “0.38 and 4.9 pole outages per year” be “0.16 and 4.9 pole outages per year”?

A. Nalcor believes the phrase “0.38 and 4.9 pole outages per year” to be appropriate. Table 5 from the CIGRE report¹ discussed in Exhibit 106 is reproduced below (emphasis added):

(B) 2 Terminal Systems - 1 Converter per Pole

System	2007				2008				Years	Average to 2008			
	Pole		Bipole		Pole		Bipole			Pole		Bipole	
	f _p	d _p	f _b	d _b	f _p	d _p	f _b	d _b		f _p	d _p	f _b	d _b
Skagerak 1 & 2	1.25	3.1	0.00	0.0	2.00	3.8	0.50	1.0	20	1.54	17.1	0.13	1.03
Skagerak 3 (1)	1.00	1503.2	-	-	0.50	4360.4	-	-	15	1.53	484.2	-	-
Square Butte	1.00	4.1	1.50	0.3	5.25	0.8	0.00	0.0	18	2.85	6.2	0.42	2.27
CU	0.50	23.8	0.00	0.0	1.25	58.5	0.00	0.0	20	1.71	4.6	0.28	1.66
Gotland 2 & 3	0.25	0.8	0.00	0.0	0.50	46.6	0.00	0.0	20	0.38	35.8	0.20	1.49
Fennoskan (1)	2.00	14.2	-	-	1.50	46.4	-	-	19	2.26	10.1	-	-
SACOI (3)	3.33	1.7	-	-	1.67	2.5	-	-	16	4.90	2.6	-	-
New Zealand Pole 2 (3)	2.50	4.3	-	-	0.50	0.7	-	-	17	1.65	2.7	-	-
Kontek (1)	0.50	2.7	-	-	1.00	32.0	-	-	7	0.86	15.7	-	-
SwePol (1)	0.50	2.4	-	-	2.00	1.7	-	-	8	3.56	21.0	-	-
Kii Channel	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	8	0.16	99.6	0.00	0.00
Grita (1)	4.00	42.2	-	-	4.5	9.3	-	-	5	2.70	17.1	-	-

The Kii Channel system has demonstrated excellent performance during the eight years of operation reported in Table 5, and while the table indicates a pole outage rate ranging between 0.16 and 4.9 outages per year, Nalcor is of the opinion that operating experience from systems with longer operating history may be a better indicator of long-term performance. For systems with 15 or more years of operating history, the range is between 0.38 and 4.90 outages per year.

¹ CIGRE B4_2009_2010 “A Survey of the Reliability of HVdc Systems Throughout the World During 2007 – 2008”, by M.G. Bennett, N.S. Dhaliwal, A. Leirbukt, CIGRE 2010

- 1 Please note Nalcor compared the upper end of the pole outage range (9.8 pole
- 2 outages on a bipole system) to the rule of thumb of one pole outage per 100 km per
- 3 year, but has not relied on the lower end of the range in its analysis.