

1 Q. Please describe each air blast circuit breaker defect or malfunction that affected the  
2 generation or transmission system operations from 2000 through 2013.

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5 A. Please see PR-PUB-NLH-076 Attachment 1.

Year	Date	HYDRO_ID	Subcompent Failure	Generation / Transmission Affected	Customer Outage	Defect Description
<b>No Customer Outage</b>						
2002	May 6, 2002	HWDB1L36	Integral Set - Insulation System	Transmission	No	B1L36 forced close due to air leak. No customer outage.
2003	January 18, 2003	BDEB2T4	Integral Set - Interrupting Medium	Generation - BDE G4	No	After receiving open pulse, B2T4 repeatedly opened & closed before being taken out of service. Air leak on breaker. No customer outage.
2003	December 11, 2003	BDEB2T4	Integral Set - Interrupting Medium	Generation - BDE G4	No	B2T4 experienced an air leak. No customer outage.
2006	December 8, 2006	CBCB1B2	Protection and Control Equipment	Transmission	No	Attempt to close B1B2 failed. B1B2 closed on Dec 8 @ 02:44 hrs. Problem was blown fuses. No customer outage.
2007	May 12, 2007	BBKB1L11	Protection and Control Equipment	Transmission	No	B1L11 tripped for no apparent reason. B1L11 closed on May 12 @ 13:48 hrs. No problems found. On May 18 @ 10:50, B1L11 opened at request of P&C Tech to check operation. B1L11 closed @ 12:12 with checks completed. No problems found. No customer outage.
2008	September 3, 2008	MDRB1L28	Protection and Control Equipment	Transmission	No	B1L28 failed to close from ECC. B1L28 closed on Sept 3 @ 09:29 hrs. Input to PLC was blown. No customer outage.
2008	September 4, 2008	WAVB1L37	Integral Set - Interrupting Medium	Transmission	No	B1L37 removed from service due to air leak. Restored to service on Sept 5 @ 15:21 hrs. No customer outage.
2009	November 26, 2009	WAVB1L17	Integral Set - Auxiliary Equipment	Transmission	No	B1L17 tripped open Nov 26 @ 19:12 hrs. Replaced leaking air line between servo and main valve. 20 ms filter added to "F" circuit in PLC. Cabling to 63F circuit megged ok. 63 function tested. All reclosing function tested. "T" relay checked. Restored to service on Nov 27 @ 17:37 hrs. No customer outage.
2009	November 27, 2009	BDEB4B5	Protection and Control Equipment	Transmission	No	B4B5 tripped for unknown reason. Restored to service on Nov 27 @ 09:24. Suspect cabinet moisture. Heavy rains at the time. No customer outage.
2010	March 18, 2010	BUCL05L33	Integral Set - Other	Transmission	No	L05L33 tripped. Root cause not determined. No customer outage.
2010	June 11, 2010	HRDB1B11	Bushings ( including CTs)	Generation - HRD G1 Transmission - TL217	No	B11/B13 230 kV lockout; TL217 tripped @ WAV; SPO 308-B tripped; HWD synch cond. tripped & u/a; (trip caused by fire on B1B11 @ HRD TS); HWD synch cond. restored on Jun 11 @ 20: 47 hrs; TL217 restored on Jun 12 @ 00:19 hrs.
2010	August 4, 2010	BDEB4B5	Circuit Switcher	Transmission	No	B4B5 taken out of service to repair broken stack. Installed new insulator, new interrupter, and completed timing test. Work order completed Aug 16, 2010. No customer outage.
2011	November 7, 2011	HRDB12L17	Integral Set - Interrupting Medium	Transmission	No	B12L17 taken out of service to check valve operation. Back in service on Nov 8, 05:04 hrs. No customer outage.

Year	Date	HYDRO_ID	Subcompent Failure	Generation / Transmission Affected	Customer Outage	Defect Description
2012	June 5, 2012	BBKB1L09	Integral Set - Interrupting Medium	Transmission	No	TL233 unavailable for voltage control with B1L09 inoperative from Jun 5, 09:11 hrs to Jun 5, 16:32 hrs. No customer outage.
2012	July 6, 2012	BBKL09L33	Integral Set - Interrupting Medium	Transmission	No	Top cam adjustment required to fix intermittent power loss to open/close coil. No customer outage.
2012	July 12, 2012	HRDB1L17	Integral Set - Resistors or grading capacitors	Transmission	No	B1L17 taken out of service due to leaking capacitor. Back in service on Aug 1 @ 18:37 hrs. No customer outage.
2012	August 14, 2012	BDEB2T3	Integral Set - Interrupting Medium	Gen - BDE G3	No	G3 out of service until B2T3 air leak repair was completed @ 18:22 hrs. No customer outage.
2013	August 10, 2013	SSDB1L03	Protection and Control Equipment	Transmission	No	Auto Synch Check Relay Issues. No customer outage.
<b>Customer Outage</b>						
2013	January 11, 2013	STBB1L31	Integral Set - Interrupting Medium	Transmission	Yes	There was a problem with phase C auxiliary contact that fixed itself after operation. The most likely cause was high resistance auxiliary contacts.
2013	January 11, 2013	BUCL05L33	Integral Set - Interrupting Medium	Transmission	Yes	Upon investigation this breaker had a broken shaft for its auxiliary contacts and phase C interrupting head had cracked porcelain.
2013	January 11, 2013	HRDB12L17	Integral Set - Interrupting Medium	Transmission	Yes	Following the events on January 11, 2013 breaker B12L17 was left open due to its breaker failure. The most likely cause of the breaker failure of B12L17 was high resistance auxiliary contacts. Breaker B12L17 was operated several times to clean contacts, with no problems and was restored to allow TLL217 to go back in service.
2013	January 11, 2013	HRDB1L17	Integral Set - Insulation System	Generation - HRD G1	Yes	B1L17 flashed over during a winter storm. Major customer outage.
2013	April 17, 2013	BDEB2T4	Integral Set - Interrupting Medium	Generation - BDE G 3, 4, 5, 6 Transmission - TL202	Yes	B2B4 forced closed on loss of air, resulting in 230 kV bus lockout which tripped G3 & G5 in addition to making G4, G6, & TL202 unavailable to system. Major customer outage.