

Northwest Territories Power Corporation L199 Transmission Line Outages 1990-2009

Table YK/FT.SMITH NTPC-16

Year	# of Transmission Outages affecting the L199	Date	Duration	Cause	Total Load at time of		Date	Summer	Winter	Duration
					Transmission Outage (kW)	Load Lost (kW)				
1990	8	17-Jun	21	Lightning	21,000	11,200	17/06/1990	0	1	21
1990		26-Jun	7	Lightning	36,200	16,200	26/06/1990	0	1	7
1990		11-Jul	17	High Line Voltage	30,600	30,600	11/07/1990	0	1	17
1990		22-Jul	28	High Line Voltage drop – SF	26,500	26,500	22/07/1990	0	1	28
1990		12-Aug	28	Lightning	24,800	24,100	12/08/1990	0	1	28
1990		04-Sep	11	Raven 700 Sub	29,600	27,500	04/09/1990	0	1	11
1990		06-Sep	21	Complete Town and Nerco	32,700	21,200	06/09/1990	0	1	21
1990		07-Sep	21	Ground Fault Nerco Line	29,700	14,000	07/09/1990	0	1	21
1991	9	15-May	3	Lightning	31,800	29,800	15/05/1991	0	1	3
1991		20-May	3	Lightning	18,600	18,600	20/05/1991	0	1	3
1991		20-May	12	Lightning	16,400	16,400	20/05/1991	0	1	12
1991		20-May	3	Lightning	19,600	18,100	20/05/1991	0	1	3
1991		28-Jul	4	Lightning	27,100	27,100	28/07/1991	0	1	4
1991		15-Aug	9	Lightning	26,000	26,000	15/08/1991	0	1	9
1991		15-Aug	5	Lightning	18,000	18,000	15/08/1991	0	1	5
1991		18-Aug	4	L199 Line fault	12,100	12,100	18/08/1991	0	1	4
1991	11	06-Oct	4	High Line – Unknown	22,700	22,700	06/10/1991	0	1	4
1992		27-Apr	11	Voltage swings on transmission line	22,500	21,500	27/04/1992	0	1	11
1992		27-May	14	Ground fault on Giant line	21,000	19,000	27/05/1992	0	1	14
1992		08-Jun	3	Ground fault on Giant line	25,900	20,600	08/06/1992	0	1	3
1992		16-Jun	11	SR 52-1 shorted out	27,500	23,800	16/06/1992	0	1	11
1992		23-Jun	7	Over current on Giant line	24,700	24,700	23/06/1992	0	1	7
1992		02-Jul	7	Over current on Giant line	22,700	20,400	02/07/1992	0	1	7
1992		30-Jul	4	NUL watering entering cable at transformer at 100 su	26,100	24,800	30/07/1992	0	1	4
1992	15	08-Aug	15	Fault on Giant line, no control at 100 sub	24,100	24,100	08/08/1992	0	1	15
1992		10-Aug	34	Ground fault at 200 sub, raven	31,000	27,600	10/08/1992	0	1	34
1992		16-Aug	4	Phase to Phase on Giant line	16,200	9,100	16/08/1992	0	1	4
1992		27-Aug	4	Ground switch found closed on old 115 KV line	28,400	15,200	27/08/1992	0	1	4
1993		Incomplete data					31/12/1992	0	1	0
1994		19-Jan	57	Truck hit line at Giant T-4 86 relay	NA	NA	19/01/1994	0	1	57
1994		24-Jan	32	Possible line fault - S.K. high line	NA	NA	24/01/1994	0	1	32
1994		18-Jun	89	Lightning strikes, ring bus split, town on diesel	NA	NA	18/06/1994	0	1	89
1994	5	17-Jul	3	Lightning strikes, arrester damage @ B.H.	NA	NA	17/07/1994	0	1	3
1994		17-Jul	4	Lightning strikes	NA	NA	17/07/1994	0	1	4
1994		18-Jul	2	Lightning strikes	NA	NA	18/07/1994	0	1	2
1994		10-Aug	7	Phase relay on high line operated	NA	NA	10/08/1994	0	1	7
1994		11-Aug	69	P.T. fuse blown J.L.S. sub	NA	NA	11/08/1994	0	1	69
1995		15-Jul	1	Unknown; 67n,21z1	31,300	5,500	15/07/1995	0	1	1
1995		02-Aug	3	Ring bus split, system unstable, dumped hydro	30,100	6,200	02/08/1995	0	1	3
1995		11-Aug	54	Paralleling transformers	33,200	33,200	11/08/1995	0	1	54
1995	15	11-Aug	30	T2 lockout on gas alarm	25,100	25,100	11/08/1995	0	1	30
1995		26-Dec	3	High line, 21z1,59T.L.	33,000	22,200	26/12/1995	0	1	3
1996		26-May	71	Lightning strike on highline/hunting during diesel - hys	33,400	33,400	26/05/1996	0	1	71
1996		29-Jun	119	Lightning strike relay 67N & 59TL	31,200	31,200	29/06/1996	0	1	119
1996		02-Jul	26	50. I relay possible lightning strike	36,500	36,500	02/07/1996	0	1	26
1996		02-Jul	34	Separating 34.5 ring bus	36,500	36,500	02/07/1996	0	1	34
1996		02-Jul	11	Lightning strike on highline	36,500	36,500	02/07/1996	0	1	11
1996		08-Jul	7	67N relay on BH infeed	33,100	33,100	08/07/1996	0	1	7
1996	15	10-Jul	7	Ring bus separating 34.5	24,500	15,300	10/07/1996	0	1	7

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1996		11-Jul	10 Unknown 27G &81G	32,100	32,100	11/07/1996	0	1	10
1996		01-Aug	24 Lightning BH Line	34,200	34,200	01/08/1996	0	1	24
1996		09-Aug	40 Raven 700 sub- town z protection	35,200	35,200	09/08/1996	0	1	40
1996		12-Aug	11 Lightning highline	37,000	37,000	12/08/1996	0	1	11
1996		12-Aug	8 Lightning	34,400	34,400	12/08/1996	0	1	8
1996		31-Aug	12 Westinghouse maintenance at BH tripped plant	29,100	17,800	31/08/1996	0	1	12
1996		21-Sep	62 Raven @BH	26,100	26,100	21/09/1996	0	1	62
1996		23-Nov	62 50G BH Infeed	38,500	37,500	23/11/1996	0	1	62
1997	9	06-Jan	139 High line fault	33,300	33,300	06/01/1997	0	1	139
1997		08-Feb	116 High line fault	32,200	32,200	08/02/1997	0	1	116
1997		08-May	19 Snare Fall governor oil system failed	25,000	25,000	08/05/1997	0	1	19
1997		30-Jun	8 Snare Cascades tripped (shaft seal water flow) causii	22,000	14,500	30/06/1997	0	1	8
1997		05-Jul	19 Line to ground fault on Giant protection	23,500	21,500	05/07/1997	0	1	19
1997		11-Jul	3 T4 LTC limiting	24,400	7,900	11/07/1997	0	1	3
1997		23-Sep	7 Raven Bluefish line	26,400	12,100	23/09/1997	0	1	7
1997		24-Sep	16 Raven Bluefish line	24,500	13,200	24/09/1997	0	1	16
1997		20-Dec	44 Snare Falls trip. Went from partial to full outage due t	32,000	15,000	20/12/1997	0	1	44
1998	8	29-Apr	71 Fault at Royal Oak	30,800	27,000	29/04/1998	0	1	71
1998		13-Jul	8 Lightning, no control over 500/700 subs	27,400	27400	13/07/1998	0	1	8
1998		15-Sep	72 Insulator at SF sub blew apart (37 & 35)	26,700	26,700	15/09/1998	0	1	72
1998		25-Oct	11 T # 4 gas detection trip at JLS	28,500	28,500	25/10/1998	0	1	11
1998		23-Nov	13 SF Gov. oil s/d	28,300	28,300	23/11/1998	0	1	13
1998		01-Dec	20 Static line on 115 KV making contact with conductor	28,900	27,000	01/12/1998	0	1	20
1998		05-Dec	28 115 KV line fault 67N	28,100	11,900	05/12/1998	0	1	28
1998		16-Dec	37 115 KV line fault 67N	34,900	34,900	16/12/1998	0	1	37
1999	2	10-Mar	7 MSO	32,400	30,300	10/03/1999	0	1	7
1999		24-Mar	14 Contractor magna 4	28,100	28,100	24/03/1999	0	1	14
2000	10	15-Feb	31 Tech in STS,100 sub closing	36,100	36,100	15/02/2000	0	1	31
2000		29-May	59 HI Line Trip 67n unknown	30,000	30,000	29/05/2000	0	1	59
2000		09-Jun	21 T-4 Lockout Raven @ JLS	34,000	34,000	09/06/2000	0	1	21
2000		11-Jul	42 Lightning 67N	35,000	35,000	11/07/2000	0	1	42
2000		21-Jul	12 Lightning, Problem closing @ 600	25,600	25,600	21/07/2000	0	1	12
2000		27-Jul	53 Lightning, Problems @600	33,000	33,000	27/07/2000	0	1	53
2000		30-Sep	15 HI Line Trip 21	30,000	30,000	30/09/2000	0	1	15
2000		17-Nov	30 HI Line Raven @ JLS Sub	31,700	31,700	17/11/2000	0	1	30
2000		24-Nov	75 HI Line Frost 21z	30,000	30,000	24/11/2000	0	1	75
2000		08-Dec	53 Hi line frost.	38,900	34,700	08/12/2000	0	1	53
2001	4	07-Jun	33 Operator error	30,000	30,000	07/06/2001	0	1	33
2001		20-Jun	32 Unknown	33,000	33,000	20/06/2001	0	1	32
2001		09-Jul	14 Lightning SR cascading outage occurred	27,700	26,700	09/07/2001	0	1	14
2001		28-Jul	3 Lightning SR line 67N	20,300	16,400	28/07/2001	0	1	3
2002	6	24-Jan	238 highline failure	39,700	39,700	24/01/2002	0	1	238
2002		23-May	30 (Guy wire failure) SF to SR line	29,800	29,800	23/05/2002	0	1	30
2002		19-Jun	10 SF insulator damage cause line fault	26,500	26,500	19/06/2002	0	1	10
2002		19-Jun	7 SF insulator damage cause line fault	27,800	27,000	19/06/2002	0	1	7
2002		22-Jun	24 Lightning near Rae {total}	30,300	30,300	22/06/2002	0	1	24
2002		26-Jul	8 Lightning	32,300	32,300	26/07/2002	0	1	8
2003	5	04-Jan	20 SK line fault	34,900	28,000	04/01/2003	0	1	20
2003		10-Feb	28 Line Fault	38,000	38,000	10/02/2003	0	1	28
2003		01-Aug	141 Lightning	29,100	29,000	01/08/2003	0	1	141
2003		14-Sep	37 T19 Trip Low oil 115 kv trip	21,900	21,900	14/09/2003	0	1	37
2003		23-Nov	37 SF Transformer fault Highline trip	32,600	32,500	23/11/2003	0	1	37
2004	3	11-Jul	32 Lightning	23,400	23,400	11/07/2004	0	1	32
2004		17-Jul	50 Lightning	21,600	19,000	17/07/2004	0	1	50
2004		29-Jul	64 Lightning	25,800	25,800	29/07/2004	0	1	64
2005	4	30-May	50 Lightning	26,500	26,500	30/05/2005	0	1	50

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2005		07-Jun	67 Lightning	26,800	26,800	07/06/2005	0	1	67
2005		21-Aug	48 Lightning	17,200	16,400	21/08/2005	0	1	48
2005		06-Sep	67 Lightning	24,100	24,100	06/09/2005	0	1	67
2006	14	02-Jan	567 Structure Failure	27,000	12,500	02/01/2006	0	1	567
2006		04-Jan	45 Snare Falls Govenor Failure	22,000	22,000	04/01/2006	0	1	45
2006		07-Feb	75 Structure Failure	28,100	28,100	07/02/2006	0	1	75
2006		14-Feb	39 Snare Falls Headgate Failure	29,400	29,400	14/02/2006	0	1	39
2006		19-May	74 Snare Rapids Static Exciter Failure	20,600	20,600	19/05/2006	0	1	74
2006		24-May	54 L193 - Lightning arrestor failure	21,600	21,600	24/05/2006	0	1	54
2006		27-Jun	30 Lightning	20,400	20,400	27/06/2006	0	1	30
2006		03-Jul	37 Lightning	19,400	19,400	03/07/2006	0	1	37
2006		03-Jul	34 Lightning	24,900	24,900	03/07/2006	0	1	34
2006		03-Jul	35 Lightning	20,900	20,900	03/07/2006	0	1	35
2006		23-Jul	38 Lightning	22,100	22,100	23/07/2006	0	1	38
2006		23-Jul	223 Lightning	20,600	20,600	23/07/2006	0	1	223
2006		13-Aug	90 Lightning	16,800	16,800	13/08/2006	0	1	90
2006		13-Aug	80 Lightning	17,100	17,100	13/08/2006	0	1	80
2007	9	14-May	33 L199 Line Fault	24,600	24,600	14/05/2007	0	1	33
2007		31-May	49 Lightning	25,500	25,500	31/05/2007	0	1	49
2007		20-Jul	58 Lightning	26,300	26,300	20/07/2007	0	1	58
2007		20-Jul	56 Lightning	25,100	25,100	20/07/2007	0	1	56
2007		20-Jul	20 Lightning	25,100	25,100	20/07/2007	0	1	20
2007		20-Jul	48 Lightning	15,900	15,900	20/07/2007	0	1	48
2007		31-Jul	39 Lightning	15,800	15,800	31/07/2007	0	1	39
2007		04-Aug	18 Lightning	22,700	22,700	04/08/2007	0	1	18
2007		06-Aug	33 Lightning	18,600	18,600	06/08/2007	0	1	33
2008	14	02-Jan	64 L199 line fault	19000	19000	02/01/2008	0	1	64
2008		28-Jan	88 T5 Gas trip	31200	28300	28/01/2008	0	1	88
2008		10-Mar	49 Raven	26800	24400	10/03/2008	0	1	49
2008		29-Mar	58 Raven	26600	26600	29/03/2008	0	1	58
2008		02-Jun	23 Lightning	24500	24500	02/06/2008	0	1	23
2008		02-Jun	24 Lightning	24400	24400	02/06/2008	0	1	24
2008		02-Jun	19 Lightning	20400	20400	02/06/2008	0	1	19
2008		02-Jun	21 Lightning	20400	20400	02/06/2008	0	1	21
2008		28-Jun	229 Lightning	16200	16200	28/06/2008	0	1	229
2008		10-Aug	36 Lightning	20800	20800	10/08/2008	0	1	36
2008		11-Aug	19 Lightning	20600	20600	11/08/2008	0	1	19
2008		11-Aug	23 Lightning	15700	15700	11/08/2008	0	1	23
2008		11-Aug	20 Lightning	15200	15200	11/08/2008	0	1	20
2008		15-Sep	59 Bluefish line fault	23400	23400	15/09/2008	0	1	59
2009	6	05-Jan	322 L199 line fault	27000	27000	05/01/2009	0	1	322
2009		20-Jun	49 Bluefish line fault	22300	22300	20/06/2009	0	1	49
2009		02-Jul	21 Bluefish line fault	22600	22600	02/07/2009	0	1	21
2009		03-Jul	50 Lightning	25100	25100	03/07/2009	0	1	50
2009		11-Jul	150 Lightning	24900	23600	11/07/2009	0	1	150
2009		12-Jul	23 Lightning	20400	20400	12/07/2009	0	1	23

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	Summer outage count	Winter outage count	Summer outage minutes	Winter outage minutes	Total outage minutes	Forced outage rate
1990	8	0	154	0	154	0.000293
1991	9	0	47	0	47	8.9422E-05
1992	11	0	103	0	103	0.00019597
1994	6	2	174	89	263	0.00050038
1995	4	1	88	3	91	0.00017314
1996	14	1	442	62	504	0.0009589
1997	6	3	72	299	371	0.00070586
1998	4	4	162	98	260	0.00049467
1999	0	2	0	21	21	3.9954E-05
2000	6	4	202	189	391	0.00074391
2001	4	0	82	0	82	0.00015601
2002	5	1	79	238	317	0.00060312
2003	2	3	178	85	263	0.00050038
2004	3	0	146	0	146	0.00027778
2005	4	0	232	0	232	0.0004414
2006	10	4	726	695	1421	0.00270358
2007	9	0	354	0	354	0.00067352
2008	10	4	473	259	732	0.00139269
2009	5	1	293	322	615	0.00117009
mean					220.538462	0.00041959
standard deviation					150.183563	0.00028574
standard error of mean (stdev divided by square root of observations)					41.6534259	7.9249E-05
mean plus one standard error					262.191887	0.00049884