



CONNECTION ASSESSMENT & APPROVAL PROCESS

System Impact Assessment Study Results

For Ontario to Quebec 1250 MW HVdc Interconnection Project

CAA ID Number 2000-001

Long Term Forecasts & Assessments Department
December 15, 2000

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1.0 Summary of Results

The incorporation of the HVdc introduces a new critical contingency for the St. Lawrence phase shifters. Without mitigating measures, the HVdc could restrict flow at St. Lawrence by up to 100 MW. With all elements in service, the power system in Eastern Ontario will not thermally limit transfers over the HVdc (section 2.6).

The HVdc will influence phase shifter angles at St. Lawrence (section 2.2).

The FIO limit can be increased to accommodate the changed flow into Ottawa due to the HVdc (section 2.4).

The HVdc does not significantly alter the transient performance of the power system in eastern Ontario (section 2.8).

1.1 Facilities Modelled

2 independent HVDC poles rated at 625 MW each at Outaouais
 2 230 kV circuits on a common tower from Outaouais to Hawthorn
 1 filter + 2 capacitors + 1 reactor per pole. Each 105 Mvar @ 220 kV
 2 capacitors 155 Mvar @220 kV at Hawthorne
 20 km class b double circuit 230 kV line, 2250 a summer, 8.5 Mvar each @ 220 kV

1.2 Conditions Tested

	he	le	hi	li
Ottawa Load	1700	600	1700	600
Cherrywood E Load	2100	1000	2100	1000
HQ1 + HQ2 delivery	1250	1250	-1250	-1250
Target L33P+L34P flow	400T	363T	400N	400N
Actual L33P+L34P flow	159T	368T	400N	342N
Madawaska generation	610	610	610	610
Ottawa generation	982	982	982	982
Nanticoke generation	4000	1780	3500	1280
Lambton generation	1850	1850	400	400
Darlington generation	2790	2790	2790	2790
Lennox generation	1575	1575	1005	1005
Ontario load	22824	20585	22824	20585
Quebec load	19338	19338	16879	16879

he heavy load export, le light load export, hi heavy load export, li light load import
 ottawa = des joachims + chenaux + chat.falls + holden (all at full gate)
 madawaska = mountain chute + barrett chute + stewartville + arnprior (all at full gate)

1.3 Power Flow Summaries

HEAVYLOADEXPORT 1250_TO_QUEBEC---- 4LB8N3LK3D4B4P3LX
 -->HQ1266FIO2733FIO-C3007TEC-1096STL159X522+31807L24A339

GENERATION														
#	V	MW	MX	#	V	MW	MX	#	V	MW	MX			
6904	BRUCEBG5	0.995	825	105	2962	PIC B G5	1.034	540	219	2901	DARL G1	0.000	0	0
6905	BRUCEBG6	0.995	825	105	2963	PIC B G6	1.035	540	219	2902	DARL G2	1.019	930	240
6906	BRUCEBG7	0.995	825	105	2964	PIC B G7	1.037	540	226	2903	DARL G3	1.019	930	240
6907	BRUCEBG8	0.995	825	105	2965	PIC B G8	1.037	540	226	2904	DARL G4	1.019	930	240
1901	LENNOXG1	0.000	0	0	6328	NANTICG1	1.017	500	216	4900	LAKEVWG1	0.000	0	0
1902	LENNOXG2	0.985	525	80	6329	NANTICG2	1.009	500	192	4901	LAKEVWG2	1.007	300	33
1903	LENNOXG3	1.002	525	104	6330	NANTICG3	1.010	500	192	4905	LAKEVWG5	1.028	264	89
1904	LENNOXG4	1.002	525	104	6331	NANTICG4	1.011	500	192	4906	LAKEVWG6	1.026	300	89
7920	LAMBTNG1	1.020	350	137	6332	NANTICG5	1.013	500	192	9900	ATIKOKAN	0.000	0	0
7921	LAMBTNG2	1.013	500	137	6333	NANTICG6	1.013	500	192	9908	TBAY G2	0.000	0	0
7922	LAMBTNG3	1.018	500	137	6334	NANTICG7	1.010	500	192	9909	TBAY G3	1.058	165	100*
7923	LAMBTNG4	1.018	500	137	6335	NANTICG8	1.011	500	192	925	OHC G1-2	1.000	66	-21

GENTOTALS											
	MW	MX		MW	MX		MW	MX		MW	MX
Nuclear	8250	2031	Fossil	8454	2707	Hydraulic	5961	1377			
Beck_2	1137	551	Abitibi	397	-13	Ottawa	982	213			
Chat_Falls	192	110	Chenau	139	37	Des_Joachims	429	41			
Arnprior	82	-19	Barrett_Chute	176	3	Mountain_Chute	170	40			
Stewartville	182	91	PGS	126	51	Mattagami	386	95			
Madawaska	610	115	Beckl_Dcw	323	90	Mississagi	375	58			
Montreal	220	-8	Saunders	848	183	North_East	17	-2			
North_West	540	44	NUGS	1212	75	Condensers	0	0			

INTERFACE FLOWS											
HVDC(->HQ)	1266	-18	FIO(fio)	2733	69	FIO-C(fio-c)	3007	81			
TEC(TEC)	-1096	-1459	OH->STL(stl)	159	-34<-40	L33P	76	-14<-40			
L34P	83	-19<-40	len->h(x522+3)	1807	68	C3S@S	331	25			
M29C@M	40	-4	B5D@D	216	3	L24A@A(124a)	339	-24			
w6mc	122	-6	c7bm	152	19	L51D	193	2<-25			
J5D	99	-2<-33	B3N	102	-15<17	L4D	193	3<-24			
MIOH	586	-11<-24	BLIP	1372	251	DWBLIP	3923	588<-224			
WAD	918	-7	N21-22W	11	81	EWTF	-210	60			
L24-26L	27	89	W44-45LC	387	72	OH->NY	-1487	-65			
OH->NIAG	-1643	-7	QFW	2102	-475	ALLBURG	663	305			
FS	1138	139	FETT	3750	-30	CE	2634	-480<11			
K21-22W	-200	-2<-31	F3M	0	-4<-27						

VOLTAGE REGULATION											
	V	MX		V	MX		V	MX		V	MX
5400 ALLANB60	1	124.	8100 ALGOMA	2	245.	8223 ALGOMA	1	124.			
9100 ATIKOKAN	2	244.	5100 BEACH	2	235.	5401 BEACH	1	119.			
2000 BOWMANVL	5	535.	6500 BRUCE A	2	249.	6401 BRUCE B	5	544.			
7100 BUCHANAN	2	242.	7300 BUCHANAN	1	122.	5102 BURLINGT	2	236.			
5403 BURLINGT	1	118.	7101 CHATHAM	2	236.	2100 CHERYDK1	2	242.			
4000 CLAIRVIL	5	521.	4100 CLAIRVIL	2	242.	102 DES JOAC	2	246.			
5103 DETWEILE	2	240.	5404 DETWEILE	1	123.	1104 DOBBIN	2	236.			
9103 DRYDEN	2	241.	6402 ESSA	5	523.	6501 ESSA	2	244.			
9104 FT FRANC	2	242.	9303 FT FRANC	1	120.	8000 HANMER	5	519.			
8104 HANMER	2	246.	1 HAWTHORN	5	526.	103 HAWTHORN	2	242.	311.2		
307 HAWTHORN	1	122.	3300 HEARN	1	119.	81187 HQ1	2	242.	315.0		
81188 HQ2	2	242.	7102 KEITH	2	221.	7301 KRITH KP	1	118.	L 87.8		
9107 KENORA	2	242.	9385 KENORAK7	1	121.	9110 LAKEHEAD	2	245.			
9305 LAKEHEAD	1	124.	7105 LAMBTON	2	242.	7106 LAUZNC23	2	217.	L 23.1		
7107 LAUZNC24	2	217.	7302 LAUZON	1	115.	3305 LEAS KP	1	120.			
1001 LENNOX	5	545.	1106 LENNOX	2	246.	7108 LONGWOOD	2	248.			
7000 LONGWOOD	5	542.	9111 MACKENZI	2	244.	9392 MACKENA3	1	120.	-38.8		
7160 MALDJC21	2	221.	7161 MALDJC22	2	221.	3107 MANBY E	2	242.	260.6		
3108 MANBY W	2	242.	9112 MARATHON	2	246.	9306 MARATHON	1	124.			
104 MERIVALE	2	239.	309 MER A2T2	1	122.	4003 MILTON	5	520.			
8106 MISSISSA	2	248.	5105 NANTICOK	2	244.	5003 NANTICOK	5	541.			
6503 ORANGVIL	2	241.	84326 OTAWA	81	314.	8109 PINARD	2	231.			
8001 PINARD	5	534.	8002 PORCUPIN	5	531.	4103 RICH AH2	2	241.	319.3		
7109 SCOTT	2	238.	7304 SCOTT R1	1	119.	1107 ST LAWRE	2	246.			
8112 WAWA	2	248.									

AREA / ZONE TOTALS											
IMO_GEN		23845	IMO_LOAD		22824	IMO_INT		154			
H-Q_GEN		21543	H-Q_LOAD		19338	H-Q_INT		1403			
FIO_LOAD		1743	FIO_LOSS		47	FIO_GEN		66			
FWIC_LOAD		2095	FWIC_LOSS		123	FWIC_GEN		7598			

LIGHTLOADEXPRT 1250_TO_QUEBEC---- 4LB8N3LK3D4B4P3LX
 ->HQ1262FIO1583FIO-C1850TEC-3136STL368X522+3982L24A266

GENERATION														
#	V	MW	MX	#	V	MW	MX	#	V	MW	MX			
6904	BRUCEBG5	0.994	825	102	2962	PIC B G5	1.025	540	185	2901	DARL G1	0.000	0	0
6905	BRUCEBG6	0.994	825	102	2963	PIC B G6	1.025	540	185	2902	DARL G2	1.016	930	213
6906	BRUCEBG7	0.994	825	102	2964	PIC B G7	1.019	540	160	2903	DARL G3	1.016	930	213
6907	BRUCEBG8	0.994	825	102	2965	PIC B G8	1.019	540	160	2904	DARL G4	1.016	930	213
1901	LENNOXG1	0.000	0	0	6328	NANTICG1	1.007	130	154	4900	LAKEVWG1	0.000	0	0
1902	LENNOXG2	0.960	525	-52	6329	NANTICG2	1.002	130	136	4901	LAKEVWG2	1.001	300	16
1903	LENNOXG3	0.975	525	-67	6330	NANTICG3	1.002	130	136	4905	LAKEVWG5	1.023	163	71
1904	LENNOXG4	0.975	525	-67	6331	NANTICG4	1.003	130	136	4906	LAKEVWG6	1.021	300	71
7920	LAMBTNG1	1.020	350	137	6332	NANTICG5	1.000	500	136	9900	ATIKOKAN	0.000	0	0
7921	LAMBTNG2	1.013	500	137	6333	NANTICG6	1.002	130	136	9908	TBAY G2	0.000	0	0
7922	LAMBTNG3	1.018	500	137	6334	NANTICG7	1.000	130	136	9909	TBAY G3	1.058	165	100*
7923	LAMBTNG4	1.018	500	137	6335	NANTICG8	0.999	500	136	925	OHC G1-2	1.020	66	-40

GENTOTALS								
	MW	MX		MW	MX		MW	MX
Nuclear	8250	1736	Fossil	6133	1729	Hydraulic	5961	1032
Beck_2	1137	551	Abitibi	397	-13	Ottawa	982	71
Chat_Falls	192	49	Chenau	139	-15	Des_Joachims	429	14
Arnprior	82	-41	Barrett_Chute	176	-38	Mountain_Chute	170	36
Stewartville	182	21	PGS	126	96	Mattagami	386	95
Madawaska	610	-22	Beck1_Dcw	323	93	Mississagi	375	58
Montreal	220	-8	Saunders	848	73	North_East	17	-2
North_West	540	39	NUGS	1212	50	Condensers	0	0

INTERFACE FLOWS								
	MW	MX		MW	MX		MW	MX
HVDC(->HQ)	1262	-55	FIO(fio)	1583	-374	FIO-C(fio-c)	1850	-417
TEC(TEC)	-3136	-1369	OH->STL(stl)	368	11<-40	L33P	174	9<-40
L34P	194	2<-40	len->h(x522+3)	982	-367	C3S@S	197	6
M29C@M	-10	21	B5D@D	148	-13	L24A@A(L24a)	266	-20
w6mc	122	-24	c7bm	146	-19	L51D	192	0<-28
J5D	99	-3<-36	B3N	100	-14<20	L4D	192	1<-27
MIOH	582	-16<-27	BLIP	1368	252	DWBLIP	3913	584<-27
WAD	917	274<-36	N21-22W	7	82	EWTV	-211	61
L24-26L	27	86	W44-45LC	385	72	OH->NY	-1481	-52
OH->NIAG	-1845	2	QFW	2289	-578	ALLBURG	663	302
FS	1138	135	FETT	1774	270	CE	2643	-493<11
K21-22W	-200	-6<-32	F3M	0	-5<-28			

VOLTAGE REGULATION												
	V	MX		V	MX		V	MX				
5400	ALLANB60	1	123.	228.3	8100	ALGOMA	2	245.	8223	ALGOMA	1	124.
9100	ATIKOKAN	2	244.		5100	BEACH	2	236.	5401	BEACH	1	120.
2000	BOWMANVL	5	535.		6500	BRUCE A	2	249.	6401	BRUCE B	5	544.
7100	BUCHANAN	2	243.	325.4	7300	BUCHANAN	1	122.	5102	BURLINGT	2	237.
5403	BURLINGT	1	118.	L	7101	CHATHAM	2	236.	2100	CHERYDK1	2	242.
4000	CLAIRVIL	5	522.		4100	CLAIRVIL	2	242.	102	DES JOAC	2	246.
5103	DETWEILE	2	240.	149.4	5404	DETWEILE	1	123.	1104	DOBBIN	2	243.
9103	DRYDEN	2	240.		6402	ESSA	5	523.	6501	ESSA	2	244.
9104	FT FRANC	2	242.		9303	FT FRANC	1	120.	8000	HANMER	5	519.
8104	HANMER	2	246.		1	HAWTHORN	5	549.	103	HAWTHORN	2	244.
307	HAWTHORN	1	126.		3300	HEARN	1	119.	81187	HQ1	2	245.
81188	HQ2	2	245.	315.0	7102	KEITH	2	221.	7301	KEITH KP	1	118.
9107	KENORA	2	240.		9385	KENORAK	7	121.	9110	LAKEHEAD	2	245.
9305	LAKEHEAD	1	124.	96.6	7105	LAMBTON	2	242.	7106	LAUZNC23	2	217.
7107	LAUZNC24	2	217.	L	7302	LAUZON	1	115.	3305	LEAS KP	1	120.
1001	LENNOX	5	547.	-141.6	1106	LENNOX	2	246.	7108	LONGWOOD	2	247.
7000	LONGWOOD	5	541.		9111	MACKENZI	2	244.	9392	MACKENA3	1	118.
7160	MALDJC21	2	221.		7161	MALDJC22	2	221.	3107	MANBY E	2	242.
3108	MANBY W	2	242.	260.6	9112	MARATHON	2	246.	9306	MARATHON	1	124.
104	MERIVALE	2	244.		309	MER A2T2	1	126.	4003	MILTON	5	521.
8106	MISSISSA	2	248.		5105	NANTICOK	2	244.	5003	NANTICOK	5	540.
6503	ORANGVIL	2	241.		84326	OTAWA	81	314.	8109	PINARD	2	231.
8001	PINARD	5	534.		8002	PORCUPIN	5	531.	4103	RICH AH2	2	241.
7109	SCOTT	2	238.		7304	SCOTT R1	1	119.	1107	ST LAWRE	2	246.
8112	WAWA	2	248.	-42.2								

AREA/ZONE TOTALS			
IMO_GEN	21524	IMO_LOAD	20585
H-Q_GEN	21544	H-Q_LOAD	19338
FIO_LOAD	624	FIO_LOSS	31
FWIC_LOAD	975	FWIC_LOSS	94
		IMO_INT	151
		H-Q_INT	1406
		FIO_GEN	66
		FWIC_GEN	7598

HEAVYLOADIMPORT 1250_FROM_QUEBEC-- 4LB7N3LK3D4B4P3LX
 ->HQ-1238FIO257FIO-C470TEC-3589STL-400X522+3-206L24A335

GENERATION														
#	V	MW	MX	#	V	MW	MX	#	V	MW	MX			
6904	BRUCEB5	1.004	825	161	2962	PIC B G5	1.040	540	240*	2901	DARL G1	0.000	0	0
6905	BRUCEB6	1.004	825	161	2963	PIC B G6	1.040	540	240*	2902	DARL G2	1.021	930	250
6906	BRUCEB7	1.004	825	161	2964	PIC B G7	1.038	540	229	2903	DARL G3	1.021	930	250
6907	BRUCEB8	1.004	825	161	2965	PIC B G8	1.038	540	229	2904	DARL G4	1.021	930	250
1901	LENNOXG1	0.000	0	0	6328	NANTICG1	1.020	500	232	4900	LAKEVWG1	0.000	0	0
1902	LENNOXG2	0.976	240	18	6329	NANTICG2	1.012	500	206	4901	LAKEVWG2	0.999	300	12
1903	LENNOXG3	0.993	240	24	6330	NANTICG3	1.013	500	206	4905	LAKEVWG5	1.022	254	73
1904	LENNOXG4	0.991	525	24	6331	NANTICG4	1.014	500	206	4906	LAKEVWG6	1.021	300	73
7920	LAMBTNG1	1.025	100	160*	6332	NANTICG5	1.010	500	206	9900	ATIKOKAN	0.000	0	0
7921	LAMBTNG2	1.019	100	160*	6333	NANTICG6	1.010	500	206	9908	TBAY G2	0.000	0	0
7922	LAMBTNG3	1.026	100	160*	6334	NANTICG7	1.007	500	206	9909	TBAY G3	1.058	165	100*
7923	LAMBTNG4	1.025	100	160*	6335	NANTICG8	0.000	0	0	925	OHC G1-2	1.000	66	-19

GENTOTALS											
	MW	MX		MW	MX		MW	MX		MW	MX
Nuclear	8250	2330	Fossil	5924	2430	Hydraulic	5961	1286			
Beck_2	1137	438	Abitibi	397	-13	Ottawa	982	213			
Chat_Falls	192	110	Chenau	139	37	Des_Joachims	429	41			
Arnprior	82	-28	Barrett_Chute	176	9	Mountain_Chute	170	43			
Stewartville	182	75	PGS	126	-11	Mattagami	386	95			
Madawaska	610	99	Beck1_Dcw	323	87	Mississagi	375	58			
Montreal	220	-8	Saunders	848	285	North_East	17	-2			
North_West	540	45	NUGS	1212	83	Condensers	0	0			

INTERFACE FLOWS											
HVDC(->HQ)	-1238	-5	FIO(fio)	257	-141	FIO-C(fio-c)	470	-119			
TEC(TEC)	-3589	-1129	OH->STL(stl)	-400	30<25	L33P	-199	16<25			
L34P	-200	14<25	len->h(x522+3)	-206	-221	C3S@S	16	76			
M29C@M	-101	15	B5D@D	214	7	L24A@A(124a)	335	-17			
w6mc	93	2	c7bm	121	20	L51D	193	-10<-32			
J5D	100	-10<-36	B3N	100	-20<23	L4D	193	-10<-32			
MIOH	586	-49<-32	BLIP	2844	318	DWBLIP	3949	895<-32			
WAD	1086	225<-36	N21-22W	433	27	EWTV	-210	61			
L24-26L	710	-101	W44-45LC	721	-34	OH->NY	-1487	-55			
OH->NIAG	-1083	-24	QFW	1575	-313	ALLBURG	663	307			
FS	1138	139	FETT	1270	345	CE	2594	-455<11			
K21-22W	-200	-2<-45	F3M	0	-4<-41						

VOLTAGE REGULATION												
	V	MX		V	MX		V	MX		V	MX	
5400	ALLANB60	1	124.	228.3	8100	ALGOMA	2	245.	8223	ALGOMA	1	124.
9100	ATIKOKAN	2	244.		5100	BEACH	2	237.	5401	BEACH	1	120.
2000	BOWMANVL	5	535.		6500	BRUCE A	2	249.	6401	BRUCE B	5	545.
7100	BUCHANAN	2	239.	325.4	7300	BUCHANAN	1	120.	5102	BURLINGT	2	238.
5403	BURLINGT	1	118.	L	7101	CHATHAM	2	233.	2100	CHERYDK1	2	242.
4000	CLAIRVIL	5	522.		4100	CLAIRVIL	2	242.	102	DES JOAC	2	246.
5103	DETWEILE	2	238.	149.4	5404	DETWEILE	1	122.	1104	DOBBIN	2	235.
9103	DRYDEN	2	241.		6402	ESSA	5	523.	6501	ESSA	2	244.
9104	FT FRANC	2	242.		9303	FT FRANC	1	120.	8000	HANMER	5	519.
8104	HANMER	2	246.		1	HAWTHORN	5	544.	103	HAWTHORN	2	241.
307	HAWTHORN	1	121.	93.7	3300	HEARN	1	119.	81187	HQ1	2	246.
81188	HQ2	2	246.	315.0	7102	KEITH	2	219.	7301	KEITH KP	1	117.
9107	KENORA	2	242.		9385	KENORAK7	1	121.	9110	LAKEHEAD	2	245.
9305	LAKEHEAD	1	124.	96.6	7105	LAMBTON	2	242.	7106	LAUZNC23	2	215.
7107	LAUZNC24	2	214.	L	7302	LAUZON	1	114.	3305	LEAS KP	1	120.
1001	LENNOX	5	547.	-141.6	1106	LENNOX	2	246.	7108	LONGWOOD	2	245.
7000	LONGWOOD	5	531.	L	9111	MACKENZI	2	244.	9392	MACKENA3	1	120.
7160	MALDJC21	2	219.	L	7161	MALDJC22	2	219.	3107	MANBY E	2	242.
3108	MANBY W	2	242.	260.6	9112	MARATHON	2	246.	9306	MARATHON	1	124.
104	MERIVALE	2	239.		309	MER A2T2	1	121.	4003	MILTON	5	521.
8106	MISSISSA	2	248.		5105	NANTICOK	2	244.	5003	NANTICOK	5	538.
6503	ORANGVIL	2	240.		84326	OTAWA	81	318.	8109	PINARD	2	231.
8001	PINARD	5	534.		8002	PORCUPIN	5	531.	4103	RICH AH2	2	242.
7109	SCOTT	2	237.		7304	SCOTT R1	1	119.	1107	ST LAWRE	2	246.
8112	WAWA	2	248.	-42.2								

AREA/ZONE TOTALS											
IMO_GEN		21315	IMO_LOAD		22824	IMO_INT		-2349			
H-Q_GEN		21565	H-Q_LOAD		16879	H-Q_INT		3907			
FIO_LOAD		1743	FIO_LOSS		39	FIO_GEN		66			
FWIC_LOAD		2095	FWIC_LOSS		127	FWIC_GEN		7028			

LIGHTLOADIMPORT 1250_FROM_QUEBEC-- 4LB7N3LK3D4B4P3LX
 ->HQ-1240FIO-856FIO-C-652TEC-5668STL-342X522+3-1058L24A315

GENERATION														
#	V	MW	MX	#	V	MW	MX	#	V	MW	MX			
6904	BRUCEB5	1.008	825	180	2962	PIC B G5	1.038	540	240*	2901	DARL G1	0.000	0	0
6905	BRUCEB6	1.008	825	180	2963	PIC B G6	1.038	540	240*	2902	DARL G2	1.031	930	331
6906	BRUCEB7	1.008	825	180	2964	PIC B G7	1.040	540	239	2903	DARL G3	1.031	930	331
6907	BRUCEB8	1.008	825	180	2965	PIC B G8	1.040	540	239	2904	DARL G4	1.031	930	331
1901	LENNOXG1	0.000	0	0	6328	NANTICG1	1.012	130	176	4900	LAKEVWG1	0.000	0	0
1902	LENNOXG2	0.984	240	59	6329	NANTICG2	1.006	130	156	4901	LAKEVWG2	1.003	300	23
1903	LENNOXG3	1.004	240	77	6330	NANTICG3	1.007	130	156	4905	LAKEVWG5	1.025	293	83
1904	LENNOXG4	1.002	525	77	6331	NANTICG4	1.007	130	156	4906	LAKEVWG6	1.024	300	83
7920	LAMBTNG1	1.025	100	160*	6332	NANTICG5	0.997	500	156	9900	ATIKOKAN	0.000	0	0
7921	LAMBTNG2	1.019	100	160*	6333	NANTICG6	1.000	130	156	9908	TBAY G2	0.000	0	0
7922	LAMBTNG3	1.026	100	160*	6334	NANTICG7	0.998	130	156	9909	TBAY G3	1.058	165	100*
7923	LAMBTNG4	1.025	100	160*	6335	NANTICG8	0.000	0	0	925	OHC G1-2	1.000	66	-40

GENTOTALS											
	MW	MX		MW	MX		MW	MX			
Nuclear	8250	2669	Fossil	3743	2255	Hydraulic	5961	1025			
Beck_2	1137	437	Abitibi	397	-12	Ottawa	982	126			
Chat_Falls	192	98	Chenau	139	-15	Des_Joachims	429	18			
Arnprior	82	-31	Barrett_Chute	176	-16	Mountain_Chute	170	48			
Stewartville	182	13	PGS	126	-11	Mattagami	386	95			
Madawaska	610	14	Beck1_Dcw	323	87	Mississagi	375	59			
Montreal	220	-8	Saunders	848	200	North_East	17	-2			
North_West	540	39	NUGS	1212	56	Condensers	0	0			

INTERFACE FLOWS											
	MW	MX		MW	MX		MW	MX			
HVDC(->HQ)	-1240	329	FIO(fio)	-856	39	FIO-C(fio-c)	-652	11			
TEC(TEC)	-5668	-989	OH->STL(stl)	-342	30<39	L33P	-158	16<40			
L34P	-184	14<39	len->h(x522+3)	-1058	-42	C3S@S	-127	71			
M29C@M	-157	16	B5D@D	172	-3	L24A@A(124a)	315	-4			
w6mc	90	-15	c7bm	113	-13	L51D	192	-10<-33			
J5D	99	-16<-36	B3N	101	-20<24	L4D	192	-10<-33			
MIOH	583	-56<-33	BLIP	2841	316	DWBLIP	3942	885<-33			
WAD	1085	221<-36	N21-22W	429	27	EWTV	-210	60			
L24-26L	712	-106	W44-45LC	720	-39	OH->NY	-1488	-52			
OH->NIAG	-1142	-23	QFW	1631	-343	ALLBURG	663	307			
FS	1138	142	FETT	-868	574	CE	2598	-455<11			
K21-22W	-200	-6<-48	F3M	0	-5<-44						

VOLTAGE REGULATION											
	V	MX		V	MX		V	MX			
5400 ALLANB60	1	124.	228.3	8100 ALGOMA	2	245.	8223 ALGOMA	1	124.		
9100 ATIKOKAN	2	244.		5100 BEACH	2	237.	5401 BEACH	1	120.		
2000 BOWMANVL	5	535.		6500 BRUCE A	2	249.	6401 BRUCE B	5	546.		
7100 BUCHANAN	2	239.	325.4	7300 BUCHANAN	1	120.	5102 BURLINGT	2	238.		
5403 BURLINGT	1	118.	L	7101 CHATHAM	2	234.	2100 CHERYDK1	2	242.		
4000 CLAIRVIL	5	521.		4100 CLAIRVIL	2	242.	102 DES JOAC	2	246.		
5103 DETWEILE	2	238.	149.4	5404 DETWEILE	1	121.	1104 DOBBIN	2	239.		
9103 DRYDEN	2	240.		6402 ESSA	5	522.	6501 ESSA	2	243.		
9104 FT FRANC	2	242.		9303 FT FRANC	1	120.	8000 HANMER	5	518.		
8104 HANMER	2	246.		1 HAWTHORN	5	542.	103 HAWTHORN	2	240.		
307 HAWTHORN	1	123.		3300 HEARN	1	119.	81187 HQ1	2	236.		
81188 HQ2	2	236.	210.0	7102 KEITH	2	219.	7301 KEITH KP	1	117.		
9107 KENORA	2	240.		9385 KENORAK	7	121.	9110 LAKEHEAD	2	245.		
9305 LAKEHEAD	1	124.	96.6	7105 LAMBTON	2	242.	7106 LAUZNC23	2	215.		
7107 LAUZNC24	2	215.	L 19.8	7302 LAUZON	1	114.	3305 LEAS KP	1	120.		
1001 LENNOX	5	547.	-141.6	1106 LENNOX	2	246.	7108 LONGWOOD	2	244.		
7000 LONGWOOD	5	530.	L	9111 MACKENZI	2	244.	9392 MACKENA3	1	118.		
7160 MALDJC21	2	219.	L	7161 MALDJC22	2	219.	3107 MANBY E	2	242.		
3108 MANBY W	2	242.	260.6	9112 MARATHON	2	246.	9306 MARATHON	1	124.		
104 MERIVALE	2	240.		309 MER A2T2	1	123.	4003 MILTON	5	520.		
8106 MISSISSA	2	248.		5105 NANTICOK	2	244.	5003 NANTICOK	5	536.		
6503 ORANGVIL	2	239.		84326 OTAWA	81	318.	8109 PINARD	2	231.		
8001 PINARD	5	533.		8002 PORCUPIN	5	531.	4103 RICH AH2	2	241.		
7109 SCOTT	2	237.		7304 SCOTT R1	1	119.	1107 ST LAWRE	2	246.		
8112 WAWA	2	248.	-42.2								

AREA/ZONE TOTALS			
IMO_GEN	19134	IMO_LOAD	20585
H-Q_GEN	21565	H-Q_LOAD	16879
FIO_LOAD	624	FIO_LOSS	28
FWIC_LOAD	975	FWIC_LOSS	204
		IMO_INT	-2356
		H-Q_INT	3910
		FIO_GEN	66
		FWIC_GEN	7028

LAKE ERIE CIRCULATION
 LEC1 = 177 LEC2 = 627 LEC3 = 686

LIGHTLOADNOTTRANSFER 0_WITH_QUEBEC- 4LB7N3LK3D4B4P3LX
 ->HQ0FIO341FIO-C576TEC-4183STL-3X522+3-70L24A291

GENERATION														
#	V	MW	MX	#	V	MW	MX	#	V	MW	MX			
6904	BRUCEB5	0.996	825	107	2962	PIC B G5	1.032	540	210	2901	DARL G1	0.000	0	0
6905	BRUCEB6	0.995	825	107	2963	PIC B G6	1.032	540	210	2902	DARL G2	1.018	930	231
6906	BRUCEB7	0.995	825	107	2964	PIC B G7	1.023	540	176	2903	DARL G3	1.018	930	231
6907	BRUCEB8	0.996	825	107	2965	PIC B G8	1.023	540	176	2904	DARL G4	1.018	930	231
1901	LENNOXG1	0.000	0	0	6328	NANTICG1	1.007	130	155	4900	LAKEVWG1	0.000	0	0
1902	LENNOXG2	0.963	240	-52	6329	NANTICG2	1.002	130	137	4901	LAKEVWG2	0.998	300	8
1903	LENNOXG3	0.979	240	-67	6330	NANTICG3	1.003	130	137	4905	LAKEVWG5	1.021	200	67
1904	LENNOXG4	0.976	525	-67	6331	NANTICG4	1.003	130	137	4906	LAKEVWG6	1.019	300	67
7920	LAMBTNG1	1.021	100	133	6332	NANTICG5	0.997	500	137	9900	ATIKOKAN	0.000	0	0
7921	LAMBTNG2	1.012	500	133	6333	NANTICG6	1.000	130	137	9908	TBAY G2	0.000	0	0
7922	LAMBTNG3	1.017	500	133	6334	NANTICG7	0.998	130	137	9909	TBAY G3	1.057	165	100*
7923	LAMBTNG4	1.017	500	133	6335	NANTICG8	0.000	0	0	925	OHC G1-2	1.015	66	-40

GENTOTALS											
	MW	MX		MW	MX		MW	MX			
Nuclear	8250	1893	Fossil	4850	1565	Hydraulic	5961	849			
Beck_2	1137	475	Abitibi	397	-12	Ottawa	982	75			
Chat_Falls	192	52	Chenau	139	-15	Des_Joachims	429	14			
Arnprior	82	-41	Barrett_Chute	176	-29	Mountain_Chute	170	39			
Stewartville	182	15	PGS	126	-11	Mattagami	386	95			
Madawaska	610	-17	Beck1_Dcw	323	88	Mississagi	375	60			
Montreal	220	-8	Saunders	848	62	North_East	17	-2			
North_West	540	43	NUGS	1212	46	Condensers	0	0			

INTERFACE FLOWS											
HVDC(->HQ)	0	-21	FIO(fio)	341	-311	FIO-C(fio-c)	576	-352			
TEC(TEC)	-4183	-1205	OH->STL(stl)	-3	-8	L33P	-2	-4			
L34P	-2	-4	len->h(x522+3)	-70	-340	C3S@S	42	33			
M29C@M	-81	25	B5D@D	160	-11	L24A@A(124a)	291	-19			
w6mc	106	-23	c7bm	129	-18	L51D	185	4<-22			
J5D	95	-21<-30	B3N	101	-14<15	L4D	185	5<-22			
MIOH	566	-25<-22	BLIP	1599	231	DWBLIP	3880	553<-22			
WAD	943	259<-30	N21-22W	73	73	EWTV	61	61			
L24-26L	139	67	W44-45LC	437	47	OH->NY	-1466	-65			
OH->NIAG	-1460	-43	QFW	1931	-459	ALLBURG	663	307			
FS	1140	135	FETT	693	424	CE	2622	-468<11			
K21-22W	-203	-7<-42	F3M	-1	-5<-38						

VOLTAGE REGULATION												
	V	MX		V	MX		V	MX				
5400	ALLANB60	1	124.	228.3	8100	ALGOMA	2	245.	8223	ALGOMA	1	124.
9100	ATIKOKAN	2	243.		5100	BEACH	2	237.	5401	BEACH	1	120.
2000	BOWMANVL	5	535.		6500	BRUCE A	2	249.	6401	BRUCE B	5	545.
7100	BUCHANAN	2	243.	325.4	7300	BUCHANAN	1	122.	5102	BURLINGT	2	238.
5403	BURLINGT	1	119.	L	7101	CHATHAM	2	237.	2100	CHERYDK1	2	242.
4000	CLAIRVIL	5	522.		4100	CLAIRVIL	2	242.	102	DES JOAC	2	246.
5103	DETWEILE	2	240.	149.4	5404	DETWEILE	1	123.	1104	DOBBIN	2	242.
9103	DRYDEN	2	239.		6402	ESSA	5	523.	6501	ESSA	2	244.
9104	FT FRANC	2	241.		9303	FT FRANC	1	120.	8000	HANMER	5	519.
8104	HANMER	2	246.		1	HAWTHORN	5	550.	103	HAWTHORN	2	243.
307	HAWTHORN	1	125.		3300	HEARN	1	119.	81187	HQ1	2	244.
81188	HQ2	2	244.		7102	KEITH	2	223.	7301	KEITH KP	1	119.
9107	KENORA	2	240.		9385	KENORAK7	1	121.	9110	LAKEHEAD	2	245.
9305	LAKEHEAD	1	124.	96.6	7105	LAMBTON	2	242.	7106	LAUZNC23	2	219.
7107	LAUZNC24	2	218.	L	7302	LAUZON	1	116.	3305	LEAS KP	1	120.
1001	LENNOX	5	548.	-141.6	1106	LENNOX	2	246.	7108	LONGWOOD	2	247.
7000	LONGWOOD	5	540.	L	9111	MACKENZI	2	243.	9392	MACKENA3	1	118.
7160	MALDJC21	2	223.		7161	MALDJC22	2	223.	3107	MANBY E	2	242.
3108	MANBY W	2	242.	260.6	9112	MARATHON	2	246.	9306	MARATHON	1	124.
104	MERIVALE	2	243.		309	MER A2T2	1	125.	4003	MILTON	5	521.
8106	MISSISSA	2	248.		5105	NANTICOK	2	244.	5003	NANTICOK	5	538.
6503	ORANGVIL	2	241.		84326	OTAWA	81	313.	8109	PINARD	2	231.
8001	PINARD	5	534.		8002	PORCUPIN	5	531.	4103	RICH AH2	2	242.
7109	SCOTT	2	238.		7304	SCOTT R1	1	119.	1107	ST LAWRE	2	246.
8112	WAWA	2	247.	-42.2								

AREA/ZONE TOTALS			
IMO_GEN	20241	IMO_LOAD	20585
H-Q_GEN	21514	H-Q_LOAD	18129
FIO_LOAD	624	FIO_LOSS	13
FWIC_LOAD	975	FWIC_LOSS	114
		IMO_INT	-1101
		H-Q_INT	2656
		FIO_GEN	66
		FWIC_GEN	7028

LAKE ERIE CIRCULATION

LEC1 = 160 LEC2 = 610 LEC3 = 582

2.0 Affect of Outaouais HVdc on the Power System in Eastern Ontario

2.1 Distribution of Flow into Ottawa

From Jan 1, 2000 to Dec 14, 2000, the flow distribution into Ottawa had the pattern tabulated below.

% time	1	10	20	30	40	50	60	70	80	90	99	100
Value	609	724	780	852	913	960	1002	1044	1098	1183	1395	1543

The HVdc converter flow plus changes to line losses will extend the range of FIO flow by about 1250 MW at both ends of the flow spectrum.

FIO increases by as much as 250 MW in powerflow simulations by adding W6MC and C7BM flows just east of the taps to Chat Falls to close the FIO interface. The IMO is not presently telemetered line flows on C7BM and W6MC.

2.2 Affect of Loss of HVDC on the St. Lawrence Ties

The loss of the HVdc at maximum power will become the most limiting contingency for L33P.

Contingency	Max. Pre-contingency Flow	Summer STE (40°)
Loss of HVDC	157	334
Loss of L34P	202	334
L34P + 6 u G/R	258	334

The factors to derive these flows are taken from the Generation Shift and Outage Distribution Factor tables with L34P flow 20 MVA than L33P pre-contingency. Since the Saunders G/R scheme is not duplicated, a maximum relief of 6 Saunders units is achieved by arming 12 units. The 15 minute summer ratings of PS33 at any angle can be found by interpolating between the table values below. Fifteen minute summer ratings of R33 and the conductor cap the flow on L33P to 465 MVA at 240 kV.

Angle	-40°	-29.5°	-16°	16°	29.5°	40°
Rating	334	441	525	525	441	334

The table below shows the influence of on some critical circuits for shifting generation to the Outaouais converter.

GENERATION SHIFT FACTORS AT ZERO PHASE SHIFT ANGLE AT ST. LAWRENCE

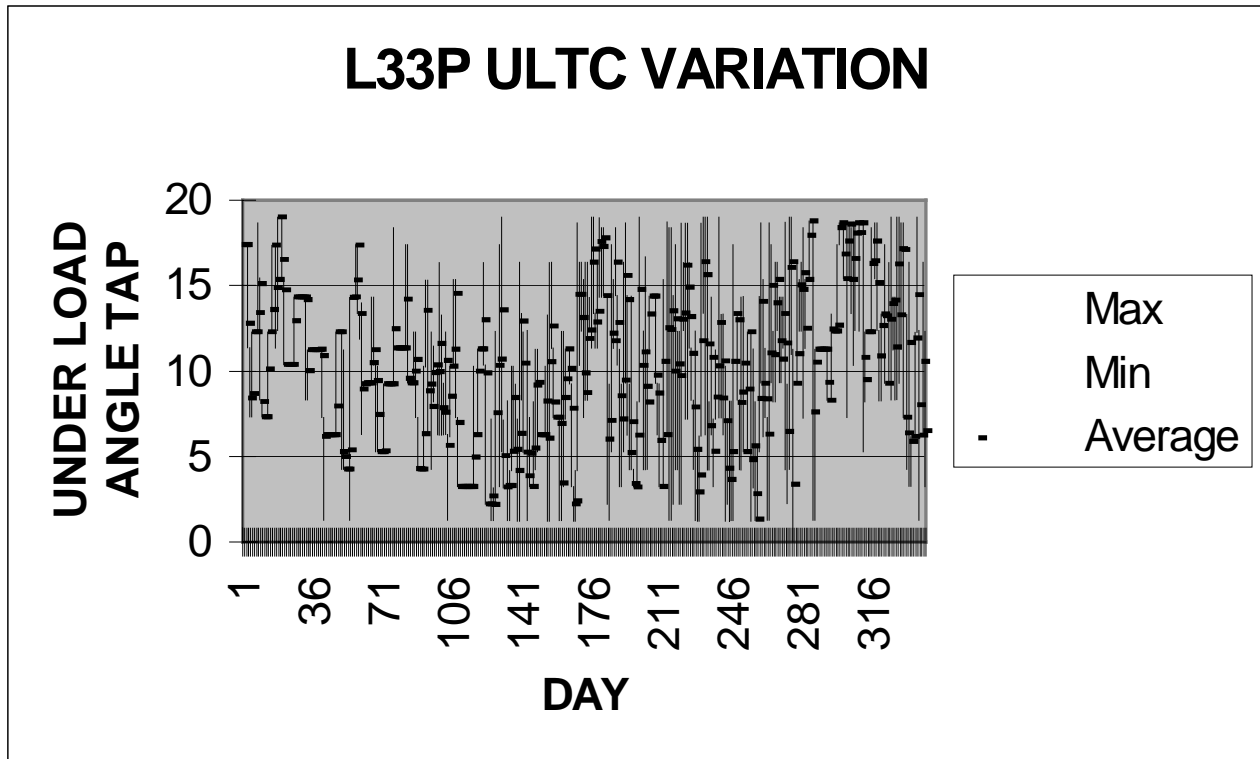
	ROSETON	MOSES	SAUNDRS	LENNOX2	BOMANVIL	LAKEVW	KINTIGH	NANTICOK	BRUCE	LAMBTON	MARYSVIL	SWING
d5a	-0.097	-0.131	-0.172	-0.058	-0.050	-0.054	-0.081	-0.058	-0.057	-0.068	-0.080	-0.081
l24a	-0.205	-0.275	-0.360	-0.122	-0.106	-0.113	-0.169	-0.122	-0.119	-0.142	-0.169	-0.169
x522a	-0.274	-0.234	-0.186	-0.337	-0.338	-0.323	-0.294	-0.321	-0.324	-0.311	-0.295	-0.295
x523a	-0.274	-0.234	-0.186	-0.337	-0.338	-0.323	-0.294	-0.321	-0.324	-0.311	-0.295	-0.295
m30a-	0.066	0.056	0.043	0.064	0.075	0.083	0.072	0.079	0.079	0.076	0.072	0.072
m31a	0.066	0.056	0.043	0.064	0.075	0.083	0.072	0.079	0.079	0.076	0.072	0.072
m32s	-0.039	-0.032	-0.023	-0.034	-0.045	-0.050	-0.043	-0.047	-0.047	-0.045	-0.043	-0.043
m29c	-0.086	-0.071	-0.052	-0.076	-0.097	-0.109	-0.094	-0.103	-0.103	-0.099	-0.093	-0.093
w6mc	-0.012	-0.012	-0.011	-0.018	-0.013	-0.013	-0.012	-0.013	-0.013	-0.013	-0.012	-0.012
c7bm	-0.012	-0.011	-0.010	-0.017	-0.012	-0.012	-0.012	-0.012	-0.012	-0.012	-0.012	-0.012
l33p	-0.165	-0.254	0.092	-0.014	-0.041	-0.050	-0.120	-0.061	-0.057	-0.086	-0.120	-0.121
l34p	-0.199	-0.307	0.111	-0.017	-0.049	-0.060	-0.145	-0.074	-0.069	-0.103	-0.144	-0.145

The table below shows outage distribution factors for some critical circuits near Ottawa.

OUTAGE DISTRIBUTION FACTORS AT ZERO PHASE SHIFT ANGLE AT ST. LAWRENCE

	D5A	L24A	X522A	X523A	M30A	M31A	M32S	M29C	W6MC	C7BM	L33P	L34P
d5a	-1.000	0.268	0.047	0.047	-0.006	-0.006	0.053	0.057	0.028	0.011	-0.062	-0.069
l24a	0.435	-1.000	0.100	0.100	-0.013	-0.013	0.110	0.120	0.059	0.023	-0.130	-0.146
x522a	0.224	0.290	-1.000	0.710	-0.036	-0.036	0.321	0.344	0.134	0.053	0.074	0.083
x523a	0.224	0.290	0.710	-1.000	-0.036	-0.036	0.321	0.344	0.134	0.053	0.074	0.083
m30a-	-0.052	-0.067	-0.063	-0.063	-1.000	0.761	0.368	0.396	0.136	0.056	-0.020	-0.022
m31a	-0.052	-0.067	-0.063	-0.063	0.761	-1.000	0.368	0.396	0.136	0.056	-0.020	-0.022
m32s	0.028	0.036	0.036	0.036	0.023	0.023	-1.000	0.076	0.022	0.009	0.013	0.015
m29c	0.063	0.082	0.080	0.080	0.052	0.052	0.157	-1.000	0.071	0.028	0.028	0.031
w6mc	0.013	0.017	0.013	0.013	0.007	0.007	0.019	0.030	-1.000	0.218	0.001	0.001
c7bm	0.012	0.016	0.012	0.012	0.007	0.007	0.018	0.028	0.526	-1.000	0.001	0.001
l33p	-0.111	-0.143	0.028	0.028	-0.004	-0.004	0.044	0.045	0.005	0.002	-1.000	0.594
l34p	-0.133	-0.173	0.034	0.034	-0.005	-0.005	0.053	0.055	0.005	0.002	0.638	-1.000

The St. Lawrence phase shifters tend to approach the upper or lower tap limit during times of high imbalance between eastern Ontario generation and load. To the extent the HVDC link is operated compensate for this imbalance (i.e export to HQ when eastern generation exceeds load and import from HQ when load exceeds generation), then the tap extremes will be approach less frequently.



Changing one angle tap on each L33P and L34P changes flow by 12 MW on each circuit. The capability of the phase shifters to control flow depends on location of the injections and withdrawals from the power system. Changes that increased flow north(south) require a compensating tap movement down(up)to maintain flow on L33P and L34P. Using the table above and assuming a linear response, it would require about a change of 7 taps on L33P and L34P to counteract a 1250 MW generation shift from the new HVDC link to Nanticoke.

The impedance of the L33P and L34P phase shifters increases as the angle is moved from zero degrees. At higher phase shift angles, the distribution factors for L33P and L34P reduce and the phase shifter become less sensitive (i.e require fewer tap changes to counteract) to generation shifts.

St. Lawrence Phase Shifter Angles

	Light load Desired =0		Heavy load Desired = 0		Heavy load Desired par flow 400T or 400N		Light load Desired par flow 400T or 400N	
	Angle	Flow	Angle	Flow	Angle	Flow	Angle	Flow
Export	-9,-9	0,0	-27,-27	0,0	-40,-40	73t,83t	-40,-40	170t,193t
No transfer	-1,-1	0,0	-18,-18	0,0	-16,-17	0,0	0,0	0,0
Import	+9,+9	0,0	-8,-8	0,0	25,26	203n,201n	40,40	161,185n

800 MW of Beau generation adds about 12.5 degrees to l33p and l34p each
Moving from 0 flow to 200 MW each changes angle from 0 to 34 each.

Angles reported on powerflow summary sheets correspond to the agreed representation but are opposite in sign to the physical angles of the phase shifters. The physical phase shift angle usually is measured from the “S” to the “L” terminals. To make the powerflow correspond to the physical, “L” should be the tapped (from) bus. In the case used, the “S” side Ontario has the tap as shown on the single line diagrams.

2.3 Sudden Changes in Voltage due to Capacitor or Bipole Switching

Load	Transfer	Caps I/S	V t ⁻	Cap On	Bi Off
				V t ⁺	V t ⁺
Heavy	Import	2	1.1062	1.1301	1.0781
Heavy	None	1	1.1000	1.1258	
Heavy	Export	2	1.0999	1.1246	1.1610
Light	Import	1	1.1291	1.1545	1.1124
Light	None	0	1.1058	1.1317	
Light	Export	1	1.1107	1.1349	1.1433

Studies were done by converting loads to the Ontario standard 50/50, 0/100 load model. The generators were also converted, the switching operation performed and the network solve using TYSL. The capacitor switching simulated by adding one 155 Mvar @220 kV shunts at Hawthorne.

To avoid limiting the use of the HVdc link, it is recommended that the new capacitors and contingencies involving the new lines HQ1 and HQ2 be incorporated in the Hawthorne reactor switching scheme and the Ottawa area capacitor switching scheme.

2.4 Steady State Voltage Analysis

System Condition	PV-knee
Without HVdc installation	2200
With HVdc installation	3350

V – is Hawthorne 240 kV voltage P- flow in Ottawa area

The P-V curves overleaf illustrate the effect of moving transformer taps, switching reactors and switching capacitors to help maintain voltage. Tap changes and shunt element switching are usual manual control actions. To mimic operator control actions, taps and shunts are modelled in the powerflow in this way:

- the reactors are controlling the 500 kV system
- the autos are controlling the 230 kV system
- the caps are controlling the 230 kV system with the range of the autos

2.5 Voltage Decline Analysis

At a point at little more than 10% back from the knee of the P-V curve (e.g. FIO flow 3000 MW), the voltage declines below were found with the following assumptions:

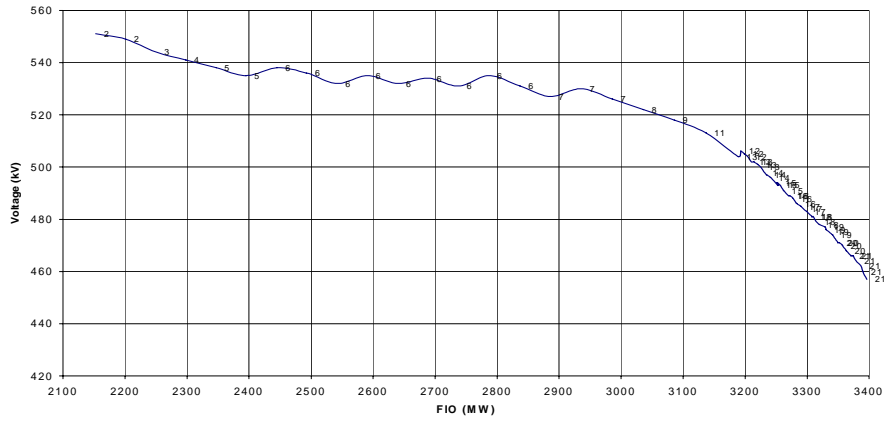
- constant P and Q loads,
- after low tension ULTC action,
- no movement of the 500/230 and 230/115 kV autotransformer taps, and
- generators controlling their terminal voltage

Contingency	% Decline	
	Haw 500	Haw 230
Hawthorne TL522	10.3	10.6
X522A	9.6	9.0
X522A + M29C	10.8	10.3

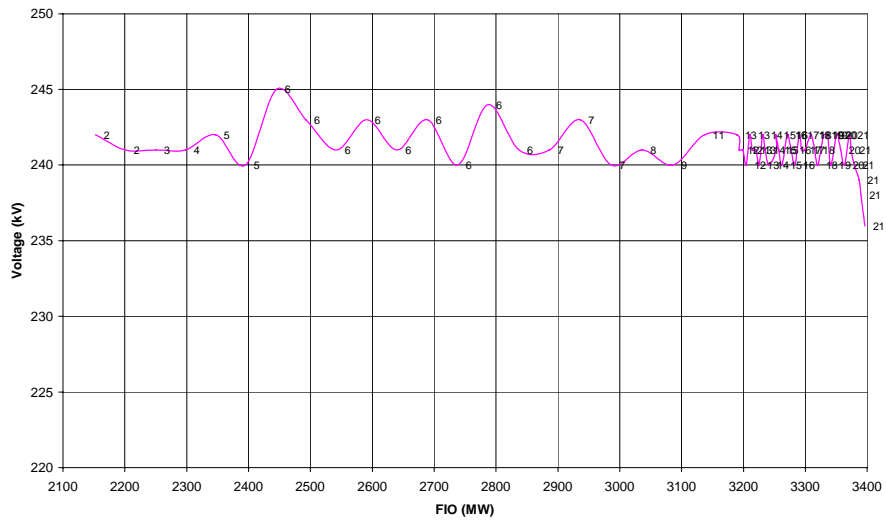
2.6 Thermal Analysis

This loss of the HVDC can be as treated as a reverse generation injection. For example, when Ontario is exporting to Quebec, the loss of the HVDC is equivalent to a 1250 MW injection into Ontario at Hawthorne. The converse is true when Ontario is importing. To account for the loss of HVDC during exports an import generation shift is required and during imports and export generation shift is required.

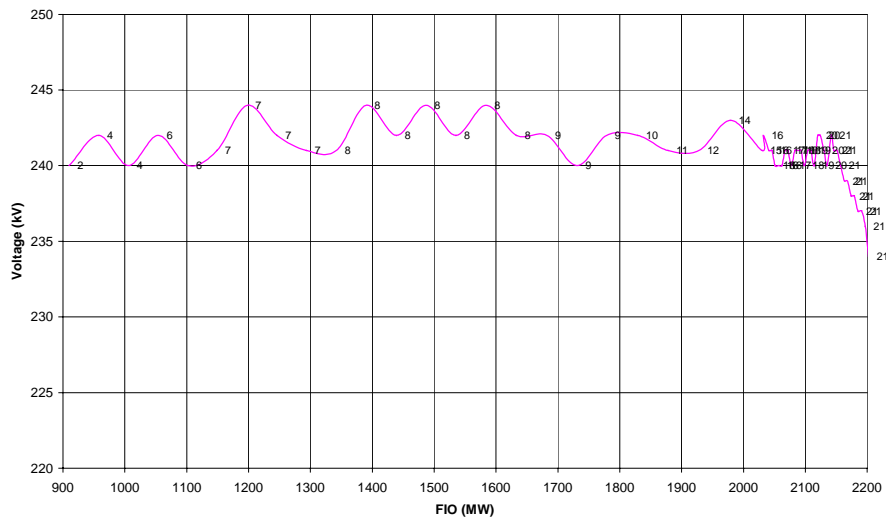
FIO vs. 500KV Hawthorne Bus
HVDC in Service



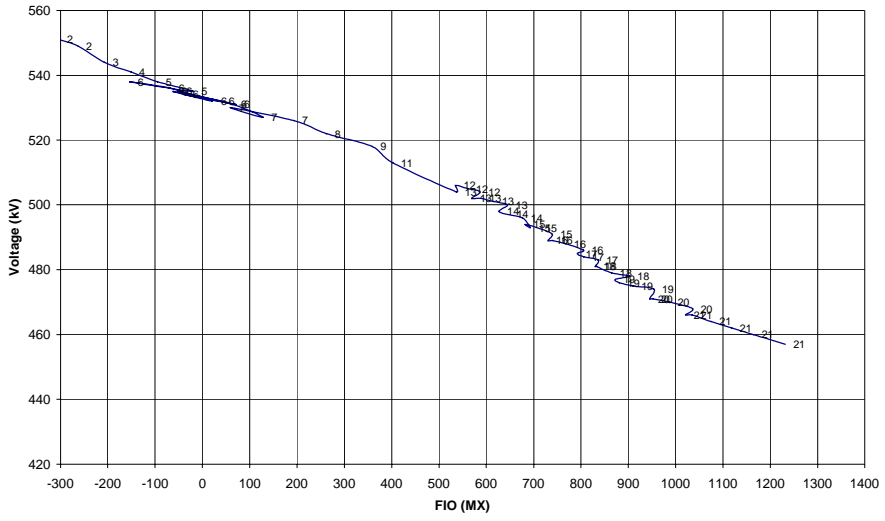
FIO vs. 220KV Hawthorne Bus
HVDC in Service



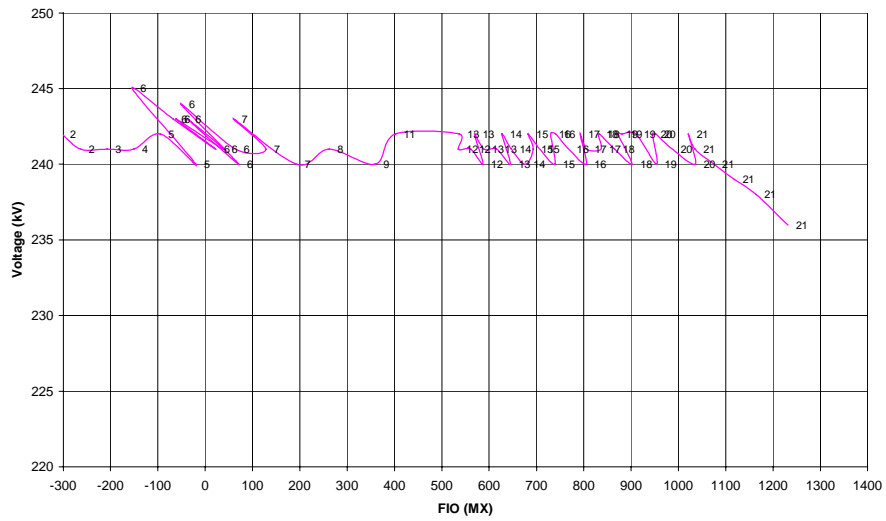
FIO vs. 200KV Hawthorne Bus
All Elements in Service with No DC Tie-Line



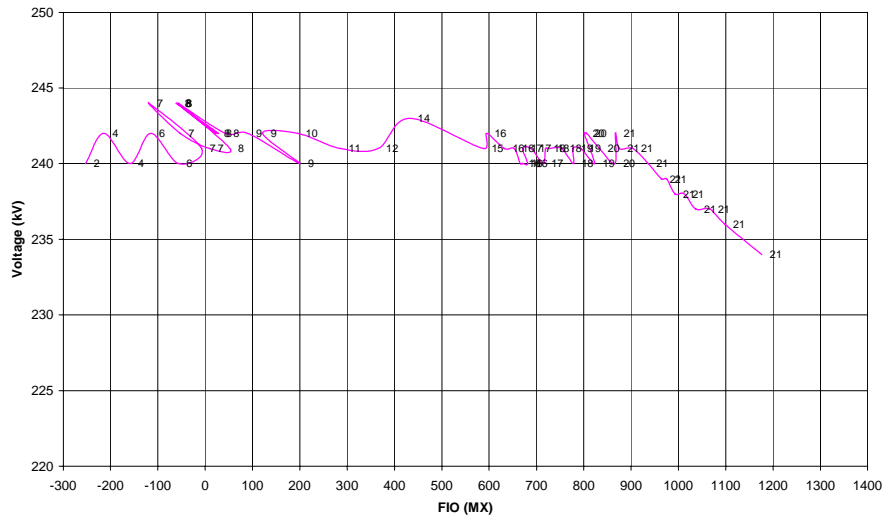
FIO vs. 500KV Hawthorne Bus
HVDC in Service



FIO vs. 200 KV Hawthorne Bus
HVDC in Service



FIO vs. 220KV Hawthorne Bus
All Elements in Service with No DC Tie-Line



Limiting elements with an Outage Transfer Distribution Factor (OTDF) less than 3% are regarded as insensitive to Outaouais transfers and are neglected. All generation shifts are with respect to Lakeview. The two tables below summarize the attached detailed analysis results. In the detail output, contingencies denoted by (?) are not presently monitored on transmission elements in eastern Ontario but are NPCC design criteria contingencies.

Flow limits for Flow into Ottawa (Closed)

Load Level	export-export	export-import for HVDC loss	import-export for HVDC loss	import import
heavy base	3832 haw T3/base			-1480 m31a/m30a
heavy	3625 haw T3/base	<-1443 m30a/m31a	3582 l24a/bipole	-1200 m30a/m31a
light base	4063 haw T3/base			-2704 haw t3/base
light	3715 haw T3/base	-2706 m29c/bipole	2699 l24a/bipole	-2384 haw t3/base

If the Ottawa load can vary in the range between 600 and 1700 MW, then flow into Ottawa must be able to vary between -650 and +2950 MW without restriction to the HVDC. There are no thermal restrictions in this range.

Flow limits for L33P+L34P

Load Level	export-export	export-import for HVDC loss	import-export for HVDC loss	import import
heavy	423 l33p/l34p			-417 l33p/l34p
heavy		-398 l33p/bipole -442 l33p/l34p	350 l33p/bipole 424 l33p/bipole	
light base	421 l33p/l34p			-415 l33p/l34p
light		-397 l33p/bipole -442 l33p/l34p	408 l33p/bipole 452 l33p/l34p	

When the flow at St. Lawrence and Outaouais is in the same direction (i.e. both toward or away from Ontario), then loss of a fully loaded HVDC link is the most limiting contingency at St. Lawrence.

2.7 Corrective Actions to Thermal Overloads on B1S, C7BM, and W6MC

Sections of circuits C7BM and W6MC appear frequently as restrictions for loss of one onto the other in the detailed analysis, but were ignored under the 3% OTDF criteria. The section between Mississippi Jct and Marchwood of W6MC is particularly limiting. The ratings match equipment specifications (477 kmil 105°C) for this section. The Barrett Chute/Stewartville overload protection schemes will reduce generation if the current tabulated below persists for 15 minutes.

Rating	C7BM – Barrett	W6MC – Stewartv	B1S - Barrett
Summer Day	705 A	665 A	350 A
Summer Night	735 A	736 A	430 A
Winter Day	785 A	800 A	540 A
Winter Night	815 A	864 A	600 A

HEAVYLOADNOTTRANSFER NONE----- 4LB7N3LK3D4B4P3LX heavyloadnottransferexport.txt
 TOTALS FOR INTERFACE MOSES-STLAW 1.00000 11.0

TOTAL TRANS	CAPAB	FROM	LIMITING	ELEMENT	TO	CKT	DISTR.	PRE-SHIFT	RATING	BAS/CNT	CONTINGENCY	DESCRI
							FACTOR	MW	A/B			
-43.4		392	MISSIS J	118	425	MARCHWDJ	118	1	0.19184	172.3	161.9	CONTINGENCY C7BM
80.5		327	ARNP JW6	118	392	MISSIS J	118	1	0.19184	172.7	186.0	CONTINGENCY C7BM
104.8		392	MISSIS J	118	425	MARCHWDJ	118	1	0.15976	146.9	161.9	CONTINGENCY B31L+L24A?
122.5		392	MISSIS J	118	425	MARCHWDJ	118	1	0.17372	142.5	161.9	CONTINGENCY X522A+T3?
122.6		392	MISSIS J	118	425	MARCHWDJ	118	1	0.17369	142.5	161.9	CONTINGENCY X523A+T2?
123.8	*	392	MISSIS J	118	425	MARCHWDJ	118	1	0.17306	142.4	161.9	CONTINGENCY X523A+T2?
155.5		366	FITZRY J	118	410	SMARCHSS	118	1	0.25470	136.0	172.8	CONTINGENCY X523A+W6MC?
167.3		402	NQL J	118	410	SMARCHSS	118	1	-0.25470	-133.0	172.8	CONTINGENCY X523A+W6MC?
235.8		1	HAWTHORN	500	103	HAWTHORN	220	T3	2.20974	293.3	790.0	BASE CASE
236.7		1	HAWTHORN	500	103	HAWTHORN	220	T2	2.20412	292.4	790.0	BASE CASE
238.0		326	ARNP JC7	118	366	FITZRY J	118	1	0.25470	88.8	146.6	CONTINGENCY X523A+W6MC?
246.3		366	FITZRY J	118	410	SMARCHSS	118	1	0.19214	127.6	172.8	CONTINGENCY W6MC
253.5		327	ARNP JW6	118	392	MISSIS J	118	1	0.15985	147.2	186.0	CONTINGENCY B31L+L24A?
259.5		327	ARNP JW6	118	392	MISSIS J	118	1	0.17365	142.8	186.0	CONTINGENCY X522A+T3?
259.6		327	ARNP JW6	118	392	MISSIS J	118	1	0.17365	142.8	186.0	CONTINGENCY X523A+T2?
261.2	*	327	ARNP JW6	118	392	MISSIS J	118	1	0.17306	142.7	186.0	CONTINGENCY X523A+T2?
261.9		402	NQL J	118	410	SMARCHSS	118	1	-0.19214	-124.6	172.8	CONTINGENCY W6MC
275.5		376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.19184	-111.2	161.9	CONTINGENCY C7BM
324.5		326	ARNP JC7	118	328	BARR CH	118	1	-0.21006	-96.0	161.9	CONTINGENCY X523A+W6MC?
328.0		1107	ST LAWRE	220	1108	STLAWR33	220	33	-0.77534	-80.2	326.0	CONTINGENCY L34P+4UGR
340.6		1	HAWTHORN	500	103	HAWTHORN	220	T3	3.17231	422.5	1468.0	CONTINGENCY HAW-T2
341.3		1	HAWTHORN	500	103	HAWTHORN	220	T2	3.16723	421.7	1468.0	CONTINGENCY HAW-T3
349.6		366	FITZRY J	118	410	SMARCHSS	118	1	0.17432	113.8	172.8	CONTINGENCY X522A+T3?
349.6		366	FITZRY J	118	410	SMARCHSS	118	1	0.17429	113.8	172.8	CONTINGENCY X523A+T2?
349.8		1	HAWTHORN	500	103	HAWTHORN	220	T3	3.11361	413.2	1468.0	CONTINGENCY ONE_POLE+T1
349.8		1	HAWTHORN	500	103	HAWTHORN	220	T3	3.11361	413.2	1468.0	CONTINGENCY HAW-T1
350.1		1	HAWTHORN	500	103	HAWTHORN	220	T1	1.97948	262.6	934.0	BASE CASE
351.0		1	HAWTHORN	500	103	HAWTHORN	220	T2	3.10569	412.1	1468.0	CONTINGENCY ONE_POLE+T1
351.0		1	HAWTHORN	500	103	HAWTHORN	220	T2	3.10569	412.1	1468.0	CONTINGENCY HAW-T1
351.7	*	366	FITZRY J	118	410	SMARCHSS	118	1	0.17367	113.6	172.8	CONTINGENCY X523A+T2?
355.7		326	ARNP JC7	118	366	FITZRY J	118	1	0.19214	80.4	146.6	CONTINGENCY W6MC
366.7		402	NQL J	118	410	SMARCHSS	118	1	-0.17434	-110.8	172.8	CONTINGENCY X522A+T3?
366.8		402	NQL J	118	410	SMARCHSS	118	1	-0.17431	-110.8	172.8	CONTINGENCY X523A+T2?
368.8	*	402	NQL J	118	410	SMARCHSS	118	1	-0.17779	-109.2	172.8	CONTINGENCY X522A+M29C?
378.5		1	HAWTHORN	500	103	HAWTHORN	220	T1	2.84442	378.7	1424.0	CONTINGENCY HAW-T3
378.9		1	HAWTHORN	500	103	HAWTHORN	220	T1	2.84175	378.4	1424.0	CONTINGENCY HAW-T2
390.5		1107	ST LAWRE	220	1178	RAISNJ24	220	1	1.43960	344.6	891.0	CONTINGENCY X522A+T3?
390.6		1107	ST LAWRE	220	1178	RAISNJ24	220	1	1.43937	344.6	891.0	CONTINGENCY X523A+T2?
392.6		1107	ST LAWRE	220	1178	RAISNJ24	220	1	1.43467	343.5	891.0	CONTINGENCY X523A+T2?
392.9		103	HAWTHORN	220	1178	RAISNJ24	220	1	-1.43960	-341.2	891.0	CONTINGENCY X522A+T3?
393.0		103	HAWTHORN	220	1178	RAISNJ24	220	1	-1.43935	-341.2	891.0	CONTINGENCY X523A+T2?
395.0		103	HAWTHORN	220	1178	RAISNJ24	220	1	-1.43467	-340.1	891.0	CONTINGENCY X523A+T2?
398.2		1107	ST LAWRE	220	1178	RAISNJ24	220	1	1.44674	330.8	891.0	CONTINGENCY X522A+M29C?
400.6		103	HAWTHORN	220	1178	RAISNJ24	220	1	-1.44671	-327.3	891.0	CONTINGENCY X522A+M29C?
401.2	*	1	HAWTHORN	500	103	HAWTHORN	220	T3	2.65747	430.9	1468.0	CONTINGENCY B31L+L24A?
402.7	*	1	HAWTHORN	500	103	HAWTHORN	220	T2	2.65071	429.7	1468.0	CONTINGENCY B31L+L24A?
411.1	*	1107	ST LAWRE	220	1178	RAISNJ24	220	1	1.28089	378.5	891.0	CONTINGENCY B31L
413.8	*	103	HAWTHORN	220	1178	RAISNJ24	220	1	-1.28097	-375.0	891.0	CONTINGENCY B31L
421.1		326	ARNP JC7	118	328	BARR CH	118	1	-0.19463	-82.1	161.9	CONTINGENCY W3B
423.6		1107	ST LAWRE	220	1108	STLAWR33	220	33	-0.77534	-6.0	326.0	CONTINGENCY L34P
434.9		100	CHAT FLS	220	146	S MARCH	220	1	1.39045	222.6	812.0	CONTINGENCY X522A+M29C?

HEAVYLOADNOTTRANSFER NONE----- 4LB7N3LK3D4B4P3LX heavyloadnottransferexport.txt
 TOTALS FOR INTERFACE FIOCLOSED 1.00000 1708.9

TOTAL TRANS	CAPAB	FROM	LIMITING	ELEMENT	TO	CKT	DISTR.	PRE-SHIFT	RATING	BAS/CNT	CONTINGENCY	DESCRI
							FACTOR	MW	A/B			
1195.2		392	MISSIS J	118	425	MARCHWDJ	118	1	0.02031	172.3	161.9	CONTINGENCY C7BM
2366.0		327	ARNP JW6	118	392	MISSIS J	118	1	0.02031	172.7	186.0	CONTINGENCY C7BM
2595.4		392	MISSIS J	118	425	MARCHWDJ	118	1	0.01691	146.9	161.9	CONTINGENCY B31L+L24A?
2762.7		392	MISSIS J	118	425	MARCHWDJ	118	1	0.01839	142.5	161.9	CONTINGENCY X522A+T3?
2763.0		392	MISSIS J	118	425	MARCHWDJ	118	1	0.01839	142.5	161.9	CONTINGENCY X523A+T2?
2774.5	*	392	MISSIS J	118	425	MARCHWDJ	118	1	0.01832	142.4	161.9	CONTINGENCY X523A+T2?
3074.4		366	FITZRY J	118	410	SMARCHSS	118	1	0.02697	136.0	172.8	CONTINGENCY X523A+W6MC?
3185.2		402	NQL J	118	410	SMARCHSS	118	1	-0.02697	-133.0	172.8	CONTINGENCY X523A+W6MC?
3832.1		1	HAWTHORN	500	103	HAWTHORN	220	T3	0.23395	293.3	790.0	BASE CASE
3841.1		1	HAWTHORN	500	103	HAWTHORN	220	T2	0.23336	292.4	790.0	BASE CASE
3853.6		326	ARNP JC7	118	366	FITZRY J	118	1	0.02697	88.8	146.6	CONTINGENCY X523A+W6MC?
3931.7		366	FITZRY J	118	410	SMARCHSS	118	1	0.02034	127.6	172.8	CONTINGENCY W6MC
4000.0		327	ARNP JW6	118	392	MISSIS J	118	1	0.01692	147.2	186.0	CONTINGENCY B31L+L24A?
4056.5		327	ARNP JW6	118	392	MISSIS J	118	1	0.01838	142.8	186.0	CONTINGENCY X522A+T3?
4056.7		327	ARNP JW6	118	392	MISSIS J	118	1	0.01838	142.8	186.0	CONTINGENCY X523A+T2?
4072.4	*	327	ARNP JW6	118	392	MISSIS J	118	1	0.01832	142.7	186.0	CONTINGENCY X523A+T2?
4078.6		402	NQL J	118	410	SMARCHSS	118	1	-0.02034	-124.6	172.8	CONTINGENCY W6MC
4207.1		376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.02031	-111.2	161.9	CONTINGENCY C7BM
4670.3		326	ARNP JC7	118	328	BARR CH	118	1	-0.02224	-96.0	161.9	CONTINGENCY X523A+W6MC?
4703.6		1107	ST LAWRE	220	1108	STLAWR33	220	33	-0.08209	-80.2	326.0	CONTINGENCY L34P+4UGR
4821.9		1	HAWTHORN	500	103	HAWTHORN	220	T3	0.33586	422.5	1468.0	CONTINGENCY HAW-T2
4829.1		1	HAWTHORN	500	103	HAWTHORN	220	T2	0.33532	421.7	1468.0	CONTINGENCY HAW-T3
4906.9		366	FITZRY J	118	410	SMARCHSS	118	1	0.01846	113.8	172.8	CONTINGENCY X522A+T3?
4907.6		366	FITZRY J	118	410	SMARCHSS	118	1	0.01845	113.8	172.8	CONTINGENCY X523A+T2?
4908.7		1	HAWTHORN	500	103	HAWTHORN	220	T3	0.32965	413.2	1468.0	CONTINGENCY ONE_POLE+T1
4908.7		1	HAWTHORN	500	103	HAWTHORN	220	T3	0.32965	413.2	1468.0	CONTINGENCY HAW-T1
4912.4		1	HAWTHORN	500	103	HAWTHORN	220	T1	0.20957	262.6	934.0	BASE CASE
4920.3		1	HAWTHORN	500	103	HAWTHORN	220	T2	0.32881	412.1	1468.0	CONTINGENCY ONE_POLE+T1
4920.3		1	HAWTHORN	500	103	HAWTHORN	220	T2	0.32881	412.1	1468.0	CONTINGENCY HAW-T1
4926.8	*	366	FITZRY J	118	410	SMARCHSS	118	1	0.01839	113.6	172.8	CONTINGENCY X523A+T2?
4964.5		326	ARNP JC7	118	366	FITZRY J	118	1	0.02034	80.4	146.6	CONTINGENCY W6MC
5068.6		402	NQL J	118	410	SMARCHSS	118	1	-0.01846	-110.8	172.8	CONTINGENCY X522A+T3?
5069.3		402	NQL J	118	410	SMARCHSS	118	1	-0.01845	-110.8	172.8	CONTINGENCY X523A+T2?
5088.7	*	402	NQL J	118	410	SMARCHSS	118	1	-0.01882	-109.2	172.8	CONTINGENCY X522A+M29C?
5179.8		1	HAWTHORN	500	103	HAWTHORN	220	T1	0.30115	378.7	1424.0	CONTINGENCY HAW-T3

HEAVYLOADNOTTRANSFER NONE----- 4LB7N3LK3D4B4P3LX heavyloadnottransferimport.tx
 TOTALS FOR INTERFACE MOSES-STLAW 1.00000 11.0

TOTAL TRANS CAPAB	FROM	LIMITING ELEMENT	TO	DISTR. FACTOR	PRE-SHIFT MW	RATING BAS/CNT	CONTINGENCY DESCR
-162.4	328	BARR CH 118	1323 ARDOCH 118	1	-0.14269	62.8	87.5 CONTINGENCY B5QK
-182.0	1323	ARDOCH 118	1368 NORTHBRK 118	1	-0.14269	60.0	87.5 CONTINGENCY B5QK
-203.5	328	BARR CH 118	1323 ARDOCH 118	1	-0.10808	64.3	87.5 CONTINGENCY C6S
-217.6	1355	LODGERM 118	1368 NORTHBRK 118	1	0.14269	-54.9	87.5 CONTINGENCY B5QK
-229.4	1323	ARDOCH 118	1368 NORTHBRK 118	1	-0.10808	61.5	87.5 CONTINGENCY C6S
-235.2	328	BARR CH 118	1323 ARDOCH 118	1	-0.14793	51.1	87.5 CONTINGENCY M32S
-254.1	1323	ARDOCH 118	1368 NORTHBRK 118	1	-0.14794	48.3	87.5 CONTINGENCY M32S
-254.3	328	BARR CH 118	1323 ARDOCH 118	1	-0.14324	49.5	87.5 CONTINGENCY X522A+M29C?
-260.0	* 328	BARR CH 118	1323 ARDOCH 118	1	-0.12949	52.4	87.5 CONTINGENCY C27P
-266.5	1303	SIDNEY 118	1355 LODGERM 118	1	0.14269	-47.9	87.5 CONTINGENCY B5QK
-273.8	1323	ARDOCH 118	1368 NORTHBRK 118	1	-0.14326	46.7	87.5 CONTINGENCY X522A+M29C?
-276.3	1355	LODGERM 118	1368 NORTHBRK 118	1	0.10808	-56.5	87.5 CONTINGENCY C6S
-281.6	* 1323	ARDOCH 118	1368 NORTHBRK 118	1	-0.12950	49.6	87.5 CONTINGENCY C27P
-285.2	103	HAWTHORN 220	121 ALBION31 220	1	-1.72658	393.6	905.0 CONTINGENCY X523A+M30A?
-285.2	103	HAWTHORN 220	120 ALBION30 220	1	-1.72658	393.6	905.0 CONTINGENCY X522A+M31A?
-288.4	1355	LODGERM 118	1368 NORTHBRK 118	1	0.14793	-43.2	87.5 CONTINGENCY M32S
-309.2	1355	LODGERM 118	1368 NORTHBRK 118	1	0.14325	-41.6	87.5 CONTINGENCY X522A+M29C?
-320.8	* 1355	LODGERM 118	1368 NORTHBRK 118	1	0.12948	-44.5	87.5 CONTINGENCY C27P
-326.7	103	HAWTHORN 220	121 ALBION31 220	1	-1.38058	438.8	905.0 CONTINGENCY M30A
-326.7	103	HAWTHORN 220	120 ALBION30 220	1	-1.38045	438.8	905.0 CONTINGENCY M31A
-335.6	1303	SIDNEY 118	1355 LODGERM 118	1	0.14794	-36.2	87.5 CONTINGENCY M32S
-340.9	1303	SIDNEY 118	1355 LODGERM 118	1	0.10808	-49.5	87.5 CONTINGENCY C6S
-350.6	104	MERIVALE 220	121 ALBION31 220	1	1.72681	-280.6	905.0 CONTINGENCY X523A+M30A?
-350.7	104	MERIVALE 220	120 ALBION30 220	1	1.72667	-280.6	905.0 CONTINGENCY X522A+M31A?
-358.0	1303	SIDNEY 118	1355 LODGERM 118	1	0.14325	-34.6	87.5 CONTINGENCY X522A+M29C?
-374.4	* 1303	SIDNEY 118	1355 LODGERM 118	1	0.14794	-30.5	87.5 CONTINGENCY C3S
-408.5	104	MERIVALE 220	120 ALBION30 220	1	1.38060	-325.8	905.0 CONTINGENCY M31A
-408.6	104	MERIVALE 220	121 ALBION31 220	1	1.38053	-325.8	905.0 CONTINGENCY M30A
-417.3	1107	ST LAWRE 220	1108 STLAWR33 220	33	-0.77534	-6.0	326.0 CONTINGENCY L34P
-462.9	104	MERIVALE 220	122 ALMONTE 220	1	-0.61636	3.9	296.0 CONTINGENCY X522A+T3?
-462.9	104	MERIVALE 220	122 ALMONTE 220	1	-0.61628	3.9	296.0 CONTINGENCY X523A+T2?
-463.6	104	MERIVALE 220	122 ALMONTE 220	1	-0.61454	4.3	296.0 CONTINGENCY X523A+T2?
-477.4	104	MERIVALE 220	122 ALMONTE 220	1	-0.59241	6.7	296.0 CONTINGENCY X523A+W6MC?
-478.0	* 104	MERIVALE 220	122 ALMONTE 220	1	-0.55515	24.6	296.0 CONTINGENCY M32S
-479.2	1	HAWTHORN 500	103 HAWTHORN 220	T3	2.20974	293.3	790.0 BASE CASE
-480.1	1	HAWTHORN 500	103 HAWTHORN 220	T2	2.20412	292.4	790.0 BASE CASE
-490.7	1107	ST LAWRE 220	1108 STLAWR33 220	33	-0.47386	-3.7	234.0 BASE CASE
-512.9	1107	ST LAWRE 220	1108 STLAWR33 220	33	-0.77534	-80.2	326.0 CONTINGENCY L34P+4UGR
-515.2	122	ALMONTE 220	2242 WILSJM29 220	1	-0.61636	-28.3	296.0 CONTINGENCY X522A+T3?
-515.2	122	ALMONTE 220	2242 WILSJM29 220	1	-0.61627	-28.3	296.0 CONTINGENCY X523A+T2?
-516.1	122	ALMONTE 220	2242 WILSJM29 220	1	-0.61454	-27.9	296.0 CONTINGENCY X523A+T2?

HEAVYLOADNOTTRANSFER NONE----- 4LB7N3LK3D4B4P3LX heavyloadnottransferimport.txt
 TOTALS FOR INTERFACE FIOCLOSD 1.00000 1708.9

TOTAL TRANS CAPAB	FROM	LIMITING ELEMENT	TO	DISTR. FACTOR	PRE-SHIFT MW	RATING BAS/CNT	CONTINGENCY DESCR
70.9	328	BARR CH 118	1323 ARDOCH 118	1	-0.01511	62.8	87.5 CONTINGENCY B5QK
-114.0	1323	ARDOCH 118	1368 NORTHBRK 118	1	-0.01511	60.0	87.5 CONTINGENCY B5QK
-117.0	328	BARR CH 118	1323 ARDOCH 118	1	-0.01144	64.3	87.5 CONTINGENCY C6S
-449.8	1355	LODGERM 118	1368 NORTHBRK 118	1	0.01511	-54.9	87.5 CONTINGENCY B5QK
-561.1	1323	ARDOCH 118	1368 NORTHBRK 118	1	-0.01144	61.5	87.5 CONTINGENCY C6S
-616.8	328	BARR CH 118	1323 ARDOCH 118	1	-0.01566	51.1	87.5 CONTINGENCY M32S
-795.1	1323	ARDOCH 118	1368 NORTHBRK 118	1	-0.01566	48.3	87.5 CONTINGENCY M32S
-796.7	328	BARR CH 118	1323 ARDOCH 118	1	-0.01571	49.5	87.5 CONTINGENCY X522A+M29C?
-851.0	* 328	BARR CH 118	1323 ARDOCH 118	1	-0.01371	52.4	87.5 CONTINGENCY C27P
-912.2	1303	SIDNEY 118	1355 LODGERM 118	1	0.01511	-47.9	87.5 CONTINGENCY B5QK
-980.8	1323	ARDOCH 118	1368 NORTHBRK 118	1	-0.01517	46.7	87.5 CONTINGENCY X522A+M29C?
-1004.5	1355	LODGERM 118	1368 NORTHBRK 118	1	0.01144	-56.5	87.5 CONTINGENCY C6S
-1054.6	* 1323	ARDOCH 118	1368 NORTHBRK 118	1	-0.01371	49.6	87.5 CONTINGENCY C27P
-1088.8	103	HAWTHORN 220	121 ALBION31 220	1	-0.18280	393.6	905.0 CONTINGENCY X523A+M30A?
-1088.8	103	HAWTHORN 220	120 ALBION30 220	1	-0.18280	393.6	905.0 CONTINGENCY X522A+M31A?
-1119.1	1355	LODGERM 118	1368 NORTHBRK 118	1	0.01566	-43.2	87.5 CONTINGENCY M32S
-1315.4	1355	LODGERM 118	1368 NORTHBRK 118	1	0.01517	-41.6	87.5 CONTINGENCY X522A+M29C?
-1425.1	* 1355	LODGERM 118	1368 NORTHBRK 118	1	0.01371	-44.5	87.5 CONTINGENCY C27P
-1480.4	103	HAWTHORN 220	121 ALBION31 220	1	-0.14617	438.8	905.0 CONTINGENCY M30A
-1480.7	103	HAWTHORN 220	120 ALBION30 220	1	-0.14615	438.8	905.0 CONTINGENCY M31A
-1564.9	1303	SIDNEY 118	1355 LODGERM 118	1	0.01566	-36.2	87.5 CONTINGENCY M32S
-1614.8	1303	SIDNEY 118	1355 LODGERM 118	1	0.01144	-49.5	87.5 CONTINGENCY C6S
-1706.7	104	MERIVALE 220	121 ALBION31 220	1	0.18282	-280.6	905.0 CONTINGENCY X523A+M30A?
-1706.9	104	MERIVALE 220	120 ALBION30 220	1	0.18281	-280.6	905.0 CONTINGENCY X522A+M31A?
-1775.9	1303	SIDNEY 118	1355 LODGERM 118	1	0.01517	-34.6	87.5 CONTINGENCY X522A+M29C?
-1931.0	* 1303	SIDNEY 118	1355 LODGERM 118	1	0.01566	-30.5	87.5 CONTINGENCY C3S
-2253.5	104	MERIVALE 220	120 ALBION30 220	1	0.14617	-325.8	905.0 CONTINGENCY M31A
-2253.8	104	MERIVALE 220	121 ALBION31 220	1	0.14616	-325.8	905.0 CONTINGENCY M30A
-2336.1	1107	ST LAWRE 220	1108 STLAWR33 220	33	-0.08209	-6.0	326.0 CONTINGENCY L34P
-2766.8	104	MERIVALE 220	122 ALMONTE 220	1	-0.06526	3.9	296.0 CONTINGENCY X522A+T3?
-2767.4	104	MERIVALE 220	122 ALMONTE 220	1	-0.06525	3.9	296.0 CONTINGENCY X523A+T2?
-2774.0	104	MERIVALE 220	122 ALMONTE 220	1	-0.06506	4.3	296.0 CONTINGENCY X523A+T2?
-2903.6	104	MERIVALE 220	122 ALMONTE 220	1	-0.06272	6.7	296.0 CONTINGENCY X523A+W6MC?
-2909.3	* 104	MERIVALE 220	122 ALMONTE 220	1	-0.05878	24.6	296.0 CONTINGENCY M32S
-2921.4	1	HAWTHORN 500	103 HAWTHORN 220	T3	0.23395	293.3	790.0 BASE CASE

HEAVYLOADEXPORT NONE----- 4LB8N3LK3D4B4P3LX heavyloadexportexport.txt
 TOTALS FOR INTERFACE MOSES-STLW 1.00000 -158.4

TOTAL TRANS CAPAB	-----	LIMITING	ELEMENT	-----	DISTR.	PRE-SHIFT	RATING	-----	CONTINGENCY	DESCRI	
	FROM		TO	CKT	FACTOR	MW	A/B				
-323.3	392	MISSIS J	118	425	MARCHWDJ	118	1	0.21052	196.6	161.9	CONTINGENCY C7BM
-210.8	327	ARNP JW6	118	392	MISSIS J	118	1	0.21052	197.0	186.0	CONTINGENCY C7BM
-181.0	392	MISSIS J	118	425	MARCHWDJ	118	1	0.19097	166.2	161.9	CONTINGENCY X522A+T3?
-181.0	392	MISSIS J	118	425	MARCHWDJ	118	1	0.19094	166.2	161.9	CONTINGENCY X523A+T2?
-180.0	392	MISSIS J	118	425	MARCHWDJ	118	1	0.19025	166.0	161.9	CONTINGENCY X523A+T2?
-175.2 *	392	MISSIS J	118	425	MARCHWDJ	118	1	0.17462	164.8	161.9	CONTINGENCY B31L+L24A?
-144.2	366	FITZRY J	118	410	SMARCHSS	118	1	0.27991	168.8	172.8	CONTINGENCY X523A+W6MC?
-130.0	402	NQLL J	118	410	SMARCHSS	118	1	-0.27991	-164.9	172.8	CONTINGENCY X523A+W6MC?
-95.8	1	HAWTHORN	500	103	HAWTHORN	220	T3	2.43325	637.7	790.0	BASE CASE
-94.9	1	HAWTHORN	500	103	HAWTHORN	220	T2	2.42706	636.0	790.0	BASE CASE
-70.0	326	ARNP JC7	118	366	FITZRY J	118	1	0.27991	121.9	146.6	CONTINGENCY X523A+W6MC?
-57.0	327	ARNP JW6	118	392	MISSIS J	118	1	0.19103	166.6	186.0	CONTINGENCY X522A+T3?
-56.9	327	ARNP JW6	118	392	MISSIS J	118	1	0.19083	166.6	186.0	CONTINGENCY X523A+T2?
-55.5	327	ARNP JW6	118	392	MISSIS J	118	1	0.19025	166.4	186.0	CONTINGENCY X523A+T2?
-53.0	366	FITZRY J	118	410	SMARCHSS	118	1	0.21085	150.6	172.8	CONTINGENCY W6MC
-52.0 *	327	ARNP JW6	118	392	MISSIS J	118	1	0.19471	165.3	186.0	CONTINGENCY X522A+M29C?
-34.2	402	NQLL J	118	410	SMARCHSS	118	1	-0.21085	-146.6	172.8	CONTINGENCY W6MC
-26.5	376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.21052	-134.1	161.9	CONTINGENCY C7BM
-0.7	1	HAWTHORN	500	103	HAWTHORN	220	T3	3.49443	917.0	1468.0	CONTINGENCY HAW-T2
0.0	1	HAWTHORN	500	103	HAWTHORN	220	T2	3.48886	915.5	1468.0	CONTINGENCY HAW-T3
2.1	326	ARNP JC7	118	328	BARR CH	118	1	-0.23086	-124.9	161.9	CONTINGENCY X523A+W6MC?
7.6	1	HAWTHORN	500	103	HAWTHORN	220	T3	3.42972	898.8	1468.0	CONTINGENCY HAW-T1
8.1	1	HAWTHORN	500	103	HAWTHORN	220	T1	2.17970	571.2	934.0	BASE CASE
8.7	1	HAWTHORN	500	103	HAWTHORN	220	T2	3.42099	896.5	1468.0	CONTINGENCY HAW-T1
29.8	366	FITZRY J	118	410	SMARCHSS	118	1	0.19165	136.7	172.8	CONTINGENCY X522A+T3?
29.9	366	FITZRY J	118	410	SMARCHSS	118	1	0.19161	136.7	172.8	CONTINGENCY X523A+T2?
31.6 *	366	FITZRY J	118	410	SMARCHSS	118	1	0.19092	136.5	172.8	CONTINGENCY X523A+T2?
33.7	1	HAWTHORN	500	103	HAWTHORN	220	T1	3.13328	822.2	1424.0	CONTINGENCY HAW-T3
34.1	1	HAWTHORN	500	103	HAWTHORN	220	T1	3.13029	821.4	1424.0	CONTINGENCY HAW-T2
45.4	326	ARNP JC7	118	366	FITZRY J	118	1	0.21085	103.6	146.6	CONTINGENCY W6MC
50.5	402	NQLL J	118	410	SMARCHSS	118	1	-0.19164	-132.8	172.8	CONTINGENCY X522A+T3?
50.6	402	NQLL J	118	410	SMARCHSS	118	1	-0.19158	-132.8	172.8	CONTINGENCY X523A+T2?
52.3 *	402	NQLL J	118	410	SMARCHSS	118	1	-0.19092	-132.6	172.8	CONTINGENCY X523A+T2?
63.3	1	HAWTHORN	500	103	HAWTHORN	220	T3	3.42972	707.8	1468.0	CONTINGENCY ONE_POLE+T1
64.4	1	HAWTHORN	500	103	HAWTHORN	220	T2	3.42099	705.9	1468.0	CONTINGENCY ONE_POLE+T1
66.6 *	1	HAWTHORN	500	103	HAWTHORN	220	T3	3.01335	790.2	1468.0	CONTINGENCY X523A+T2?
67.3 *	1	HAWTHORN	500	103	HAWTHORN	220	T2	3.00857	788.9	1468.0	CONTINGENCY X522A+T3?
93.0	326	ARNP JC7	118	328	BARR CH	118	1	-0.21361	-108.2	161.9	CONTINGENCY W3B
97.3	100	CHAT FLS	220	146	S MARCH	220	1	1.53444	419.7	812.0	CONTINGENCY X522A+M29C?
103.7	100	CHAT FLS	220	146	S MARCH	220	1	1.48268	423.4	812.0	CONTINGENCY X522A+T3?
103.8	100	CHAT FLS	220	146	S MARCH	220	1	1.48247	423.3	812.0	CONTINGENCY X523A+T2?

HEAVYLOADEXPORT NONE----- 4LB8N3LK3D4B4P3LX heavyloadexportexport.txt
 TOTALS FOR INTERFACE FIOCLOSED 1.00000 2978.0

TOTAL TRANS CAPAB	-----	LIMITING	ELEMENT	-----	DISTR.	PRE-SHIFT	RATING	-----	CONTINGENCY	DESCRI	
	FROM		TO	CKT	FACTOR	MW	A/B				
1272.0	392	MISSIS J	118	425	MARCHWDJ	118	1	0.02036	196.6	161.9	CONTINGENCY C7BM
2435.5	327	ARNP JW6	118	392	MISSIS J	118	1	0.02036	197.0	186.0	CONTINGENCY C7BM
2744.0	392	MISSIS J	118	425	MARCHWDJ	118	1	0.01847	166.2	161.9	CONTINGENCY X522A+T3?
2744.4	392	MISSIS J	118	425	MARCHWDJ	118	1	0.01846	166.2	161.9	CONTINGENCY X523A+T2?
2754.0	392	MISSIS J	118	425	MARCHWDJ	118	1	0.01840	166.0	161.9	CONTINGENCY X523A+T2?
2804.4 *	392	MISSIS J	118	425	MARCHWDJ	118	1	0.01689	164.8	161.9	CONTINGENCY B31L+L24A?
3124.9	366	FITZRY J	118	410	SMARCHSS	118	1	0.02707	168.8	172.8	CONTINGENCY X523A+W6MC?
3271.3	402	NQLL J	118	410	SMARCHSS	118	1	-0.02707	-164.9	172.8	CONTINGENCY X523A+W6MC?
3625.2	1	HAWTHORN	500	103	HAWTHORN	220	T3	0.23531	637.7	790.0	BASE CASE
3634.1	1	HAWTHORN	500	103	HAWTHORN	220	T2	0.23471	636.0	790.0	BASE CASE
3891.4	326	ARNP JC7	118	366	FITZRY J	118	1	0.02707	121.9	146.6	CONTINGENCY X523A+W6MC?
4026.3	327	ARNP JW6	118	392	MISSIS J	118	1	0.01847	166.6	186.0	CONTINGENCY X522A+T3?
4027.7	327	ARNP JW6	118	392	MISSIS J	118	1	0.01845	166.6	186.0	CONTINGENCY X523A+T2?
4041.5	327	ARNP JW6	118	392	MISSIS J	118	1	0.01840	166.4	186.0	CONTINGENCY X523A+T2?
4068.0	366	FITZRY J	118	410	SMARCHSS	118	1	0.02039	150.6	172.8	CONTINGENCY W6MC
4077.9 *	327	ARNP JW6	118	392	MISSIS J	118	1	0.01883	165.3	186.0	CONTINGENCY X522A+M29C?
4262.3	402	NQLL J	118	410	SMARCHSS	118	1	-0.02039	-146.6	172.8	CONTINGENCY W6MC
4341.9	376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.02036	-134.1	161.9	CONTINGENCY C7BM
4608.5	1	HAWTHORN	500	103	HAWTHORN	220	T3	0.33793	917.0	1468.0	CONTINGENCY HAW-T2
4615.6	1	HAWTHORN	500	103	HAWTHORN	220	T2	0.33739	915.5	1468.0	CONTINGENCY HAW-T3
4637.1	326	ARNP JC7	118	328	BARR CH	118	1	-0.02232	-124.9	161.9	CONTINGENCY X523A+W6MC?
4694.1	1	HAWTHORN	500	103	HAWTHORN	220	T3	0.33167	898.8	1468.0	CONTINGENCY HAW-T1
4699.3	1	HAWTHORN	500	103	HAWTHORN	220	T1	0.21079	571.2	934.0	BASE CASE
4705.6	1	HAWTHORN	500	103	HAWTHORN	220	T2	0.33082	896.5	1468.0	CONTINGENCY HAW-T1
4923.9	366	FITZRY J	118	410	SMARCHSS	118	1	0.01853	136.7	172.8	CONTINGENCY X522A+T3?
4924.7	366	FITZRY J	118	410	SMARCHSS	118	1	0.01853	136.7	172.8	CONTINGENCY X523A+T2?
4942.3 *	366	FITZRY J	118	410	SMARCHSS	118	1	0.01846	136.5	172.8	CONTINGENCY X523A+T2?
4964.2	1	HAWTHORN	500	103	HAWTHORN	220	T1	0.30300	822.2	1424.0	CONTINGENCY HAW-T3
4968.8	1	HAWTHORN	500	103	HAWTHORN	220	T1	0.30271	821.4	1424.0	CONTINGENCY HAW-T2
5085.5	326	ARNP JC7	118	366	FITZRY J	118	1	0.02039	103.6	146.6	CONTINGENCY W6MC
5137.9	402	NQLL J	118	410	SMARCHSS	118	1	-0.01853	-132.8	172.8	CONTINGENCY X522A+T3?
5139.0	402	NQLL J	118	410	SMARCHSS	118	1	-0.01853	-132.8	172.8	CONTINGENCY X523A+T2?
5156.9 *	402	NQLL J	118	410	SMARCHSS	118	1	-0.01846	-132.6	172.8	CONTINGENCY X523A+T2?
5270.1	1	HAWTHORN	500	103	HAWTHORN	220	T3	0.33167	707.8	1468.0	CONTINGENCY ONE_POLE+T1
5281.6	1	HAWTHORN	500	103	HAWTHORN	220	T2	0.33082	705.9	1468.0	CONTINGENCY ONE_POLE+T1

HEAVYLOADEXPORT NONE----- 4LB8N3LK3D4B4P3LX heavyloadexportimport.txt

TOTALS FOR INTERFACE MOSES-STLAW 1.00000 -158.4

TOTAL TRANS	LIMITING ELEMENT				DISTR.	SHIFT	PRE- RATING	CONTINGENCY DESCR	
CAPAB	FROM	TO	CKT	FACTOR	MW	A/B			
-398.4	1107	ST LAWRE	220	1108 STLAWR33 220 33	-0.46716	213.9	326.0	CONTINGENCY	BOTH_POLES
-431.0	328	BARR CH	118	1323 ARDOCH 118 1	-0.15690	44.7	87.5	CONTINGENCY	B5QK
-442.7	1107	ST LAWRE	220	1108 STLAWR33 220 33	-0.72973	118.5	326.0	CONTINGENCY	L34P
-445.1	1323	ARDOCH	118	1368 NORTHBRK 118 1	-0.15690	42.5	87.5	CONTINGENCY	B5QK
-453.1	328	BARR CH	118	1323 ARDOCH 118 1	-0.11939	52.3	87.5	CONTINGENCY	C6S
-456.0	328	BARR CH	118	1323 ARDOCH 118 1	-0.11700	52.7	87.5	CONTINGENCY	BOTH_POLES
-471.6	1323	ARDOCH	118	1368 NORTHBRK 118 1	-0.11939	50.1	87.5	CONTINGENCY	C6S
-474.8	1323	ARDOCH	118	1368 NORTHBRK 118 1	-0.11700	50.5	87.5	CONTINGENCY	BOTH_POLES
-474.8	1355	LODGERM	118	1368 NORTHBRK 118 1	0.15690	-37.8	87.5	CONTINGENCY	B5QK
-487.0		INTERFACE MOSES-STLAW			1.00000	-452.4	781.0	CONTINGENCY	BOTH_POLES
-492.9	328	BARR CH	118	1323 ARDOCH 118 1	-0.16306	33.0	87.5	CONTINGENCY	M32S
-495.5	1107	ST LAWRE	220	1108 STLAWR33 220 33	-0.46716	76.5	234.0	CONTINGENCY	BASE CASE
-498.2	* 328	BARR CH	118	1323 ARDOCH 118 1	-0.12643	44.5	87.5	CONTINGENCY	ONE_POLE+T1
-506.4	1323	ARDOCH	118	1368 NORTHBRK 118 1	-0.16306	30.8	87.5	CONTINGENCY	M32S
-510.7	1355	LODGERM	118	1368 NORTHBRK 118 1	0.11939	-45.4	87.5	CONTINGENCY	C6S
-514.7	1355	LODGERM	118	1368 NORTHBRK 118 1	0.11700	-45.8	87.5	CONTINGENCY	BOTH_POLES
-515.7	* 1323	ARDOCH	118	1368 NORTHBRK 118 1	-0.12643	42.3	87.5	CONTINGENCY	ONE_POLE+T1
-516.5	1303	SIDNEY	118	1355 LODGERM 118 1	0.15690	-31.3	87.5	CONTINGENCY	B5QK
-527.0		INTERFACE MOSES-STLAW			1.00000	-158.4	527.0	CONTINGENCY	BASE CASE
-530.1	1107	ST LAWRE	220	1108 STLAWR33 220 33	-0.72973	54.7	326.0	CONTINGENCY	L34P+4UGR
-535.0	1355	LODGERM	118	1368 NORTHBRK 118 1	0.16306	-26.1	87.5	CONTINGENCY	M32S
-535.3	* 1107	ST LAWRE	220	1108 STLAWR33 220 33	-0.49492	139.4	326.0	CONTINGENCY	ONE_POLE+T1
-548.2	1107	ST LAWRE	220	1109 STLAWR34 230 34	-0.53284	85.3	293.0	CONTINGENCY	BASE CASE
-552.3	103	HAWTHORN	220	121 ALBION31 220 1	-1.90356	155.2	905.0	CONTINGENCY	X523A+M30A?
-552.3	103	HAWTHORN	220	120 ALBION30 220 1	-1.90356	155.2	905.0	CONTINGENCY	X522A+M31A?
-552.6	* 1355	LODGERM	118	1368 NORTHBRK 118 1	0.12643	-37.7	87.5	CONTINGENCY	ONE_POLE+T1
-558.2	1107	ST LAWRE	220	1109 STLAWR34 230 34	-0.53284	242.0	455.0	CONTINGENCY	BOTH_POLES
-565.5	1303	SIDNEY	118	1355 LODGERM 118 1	0.11939	-38.9	87.5	CONTINGENCY	C6S
-570.6	1303	SIDNEY	118	1355 LODGERM 118 1	0.11700	-39.3	87.5	CONTINGENCY	BOTH_POLES
-575.1	1303	SIDNEY	118	1355 LODGERM 118 1	0.16306	-19.5	87.5	CONTINGENCY	M32S
-581.7	1107	ST LAWRE	220	1109 STLAWR34 230 34	-0.77840	125.5	455.0	CONTINGENCY	L33P
-586.0	103	HAWTHORN	220	121 ALBION31 220 1	-1.52047	254.8	905.0	CONTINGENCY	M30A
-586.0	103	HAWTHORN	220	120 ALBION30 220 1	-1.52047	254.8	905.0	CONTINGENCY	M31A
-599.7	* 1303	SIDNEY	118	1355 LODGERM 118 1	0.15801	-17.8	87.5	CONTINGENCY	X522A+M29C?
-611.4	104	MERIVALE	220	121 ALBION31 220 1	1.90381	-42.5	905.0	CONTINGENCY	X523A+M30A?
-611.5	104	MERIVALE	220	120 ALBION30 220 1	1.90366	-42.5	905.0	CONTINGENCY	X522A+M31A?
-618.9		INTERFACE MOSES-STLAW			1.05943	-293.1	781.0	CONTINGENCY	ONE_POLE+T1
-634.0		INTERFACE MOSES-STLAW			1.00000	-305.4	781.0	CONTINGENCY	ONE_POLE

TOTALS FOR INTERFACE FIOCLOSD 1.00000 2978.0

TOTAL TRANS	LIMITING ELEMENT				DISTR.	SHIFT	PRE- RATING	CONTINGENCY DESCR	
CAPAB	FROM	TO	CKT	FACTOR	MW	A/B			
495.7	1107	ST LAWRE	220	1108 STLAWR33 220 33	-0.04518	213.9	326.0	CONTINGENCY	BOTH_POLES
158.3	328	BARR CH	118	1323 ARDOCH 118 1	-0.01517	44.7	87.5	CONTINGENCY	B5QK
37.9	1107	ST LAWRE	220	1108 STLAWR33 220 33	-0.07057	118.5	326.0	CONTINGENCY	L34P
13.2	1323	ARDOCH	118	1368 NORTHBRK 118 1	-0.01517	42.5	87.5	CONTINGENCY	B5QK
-69.9	328	BARR CH	118	1323 ARDOCH 118 1	-0.01155	52.3	87.5	CONTINGENCY	C6S
-99.7	328	BARR CH	118	1323 ARDOCH 118 1	-0.01131	52.7	87.5	CONTINGENCY	BOTH_POLES
-260.7	1323	ARDOCH	118	1368 NORTHBRK 118 1	-0.01155	50.1	87.5	CONTINGENCY	C6S
-294.4	1323	ARDOCH	118	1368 NORTHBRK 118 1	-0.01131	50.5	87.5	CONTINGENCY	BOTH_POLES
-294.7	1355	LODGERM	118	1368 NORTHBRK 118 1	0.01517	-37.8	87.5	CONTINGENCY	B5QK
-419.9		INTERFACE MOSES-STLAW			0.09670	-452.4	781.0	CONTINGENCY	BOTH_POLES
-480.9	328	BARR CH	118	1323 ARDOCH 118 1	-0.01577	33.0	87.5	CONTINGENCY	M32S
-508.4	1107	ST LAWRE	220	1108 STLAWR33 220 33	-0.04518	76.5	234.0	CONTINGENCY	BASE CASE
-536.6	* 328	BARR CH	118	1323 ARDOCH 118 1	-0.01223	44.5	87.5	CONTINGENCY	ONE_POLE+T1
-620.7	1323	ARDOCH	118	1368 NORTHBRK 118 1	-0.01577	30.8	87.5	CONTINGENCY	M32S
-665.2	1355	LODGERM	118	1368 NORTHBRK 118 1	0.01155	-45.4	87.5	CONTINGENCY	C6S
-707.2	1355	LODGERM	118	1368 NORTHBRK 118 1	0.01131	-45.8	87.5	CONTINGENCY	BOTH_POLES
-716.7	* 1323	ARDOCH	118	1368 NORTHBRK 118 1	-0.01223	42.3	87.5	CONTINGENCY	ONE_POLE+T1
-725.7	1303	SIDNEY	118	1355 LODGERM 118 1	0.01517	-31.3	87.5	CONTINGENCY	B5QK
-834.0		INTERFACE MOSES-STLAW			0.09670	-158.4	527.0	CONTINGENCY	BASE CASE
-866.5	1107	ST LAWRE	220	1108 STLAWR33 220 33	-0.07057	54.7	326.0	CONTINGENCY	L34P+4UGR
-916.8	1355	LODGERM	118	1368 NORTHBRK 118 1	0.01577	-26.1	87.5	CONTINGENCY	M32S
-919.8	* 1107	ST LAWRE	220	1108 STLAWR33 220 33	-0.04786	139.4	326.0	CONTINGENCY	ONE_POLE+T1
-1053.0	1107	ST LAWRE	220	1109 STLAWR34 230 34	-0.05153	85.3	293.0	CONTINGENCY	BASE CASE
-1095.3	103	HAWTHORN	220	121 ALBION31 220 1	-0.18408	155.2	905.0	CONTINGENCY	X523A+M30A?
-1095.4	103	HAWTHORN	220	120 ALBION30 220 1	-0.18408	155.2	905.0	CONTINGENCY	X522A+M31A?
-1098.7	* 1355	LODGERM	118	1368 NORTHBRK 118 1	0.01223	-37.7	87.5	CONTINGENCY	ONE_POLE+T1
-1156.3	1107	ST LAWRE	220	1109 STLAWR34 230 34	-0.05153	242.0	455.0	CONTINGENCY	BOTH_POLES
-1231.6	1303	SIDNEY	118	1355 LODGERM 118 1	0.01155	-38.9	87.5	CONTINGENCY	C6S
-1285.2	1303	SIDNEY	118	1355 LODGERM 118 1	0.01131	-39.3	87.5	CONTINGENCY	BOTH_POLES
-1331.5	1303	SIDNEY	118	1355 LODGERM 118 1	0.01577	-19.5	87.5	CONTINGENCY	M32S
-1399.3	1107	ST LAWRE	220	1109 STLAWR34 230 34	-0.07527	125.5	455.0	CONTINGENCY	L33P
-1443.9	103	HAWTHORN	220	121 ALBION31 220 1	-0.14704	254.8	905.0	CONTINGENCY	M30A
-1444.0	103	HAWTHORN	220	120 ALBION30 220 1	-0.14704	254.8	905.0	CONTINGENCY	M31A
-1585.6	* 1303	SIDNEY	118	1355 LODGERM 118 1	0.01528	-17.8	87.5	CONTINGENCY	X522A+M29C?
-1707.0	104	MERIVALE	220	121 ALBION31 220 1	0.18411	-42.5	905.0	CONTINGENCY	X523A+M30A?

HEAVYLOADIMPORT NONE----- 4LB7N3LK3D4B4P3LX heavyloadimportexport.txt

TOTALS FOR INTERFACE MOSES-STLAW 1.00000 401.0

TOTAL TRANS	LIMITING ELEMENT				DISTR.	PRE-SHIFT	RATING	CONTINGENCY DESCR	
CAPAB	FROM	TO	CKT	FACTOR	MW	BAS/CNT	A/B		
331.5	1107 ST LAWRE	220 1108 STLAWR33	220 33	-0.76680	-379.3	326.0		CONTINGENCY	L34P+4UGR
350.4	1107 ST LAWRE	220 1108 STLAWR33	220 33	-0.48162	-350.4	326.0		CONTINGENCY	BOTH_POLES
424.6	1107 ST LAWRE	220 1108 STLAWR33	220 33	-0.76680	-307.9	326.0		CONTINGENCY	L34P
465.9	392 MISSIS J	118 425 MARCHWDJ	118 1	0.19805	149.0	161.9		CONTINGENCY	C7BM
466.9	INTERFACE MOSES-STLAW				1.00000	715.1	781.0	CONTINGENCY	BOTH_POLES
473.4	1107 ST LAWRE	220 1108 STLAWR33	220 33	-0.48162	-199.1	234.0		BASE CASE	
489.9	1107 ST LAWRE	220 1109 STLAWR34	230 34	-0.79207	-384.6	455.0		CONTINGENCY	L33P+4UGR
500.0 *	1107 ST LAWRE	220 1108 STLAWR33	220 33	-0.51012	-275.5	326.0		CONTINGENCY	ONE_POLE+T1
527.0	INTERFACE MOSES-STLAW				1.00000	401.0	527.0	BASE CASE	
579.1	392 MISSIS J	118 425 MARCHWDJ	118 1	0.16470	132.6	161.9		CONTINGENCY	B31L+L24A?
583.0	1107 ST LAWRE	220 1109 STLAWR34	230 34	-0.79207	-310.8	455.0		CONTINGENCY	L33P
583.3	1107 ST LAWRE	220 1109 STLAWR34	230 34	-0.51838	-360.5	455.0		CONTINGENCY	BOTH_POLES
584.9	1107 ST LAWRE	220 1109 STLAWR34	230 34	-0.51838	-197.7	293.0		BASE CASE	
586.3	327 ARNP JW6	118 392 MISSIS J	118 1	0.19805	149.3	186.0		CONTINGENCY	C7BM
601.8	392 MISSIS J	118 425 MARCHWDJ	118 1	0.12763	136.3	161.9		CONTINGENCY	BOTH_POLES
610.0	INTERFACE MOSES-STLAW				1.05919	559.6	781.0	CONTINGENCY	ONE_POLE+T1
624.0	INTERFACE MOSES-STLAW				1.00000	558.0	781.0	CONTINGENCY	ONE_POLE
635.8	392 MISSIS J	118 425 MARCHWDJ	118 1	0.14093	128.8	161.9		CONTINGENCY	ONE_POLE+T1
638.6 *	392 MISSIS J	118 425 MARCHWDJ	118 1	0.17946	119.3	161.9		CONTINGENCY	X522A+T3?
665.1	366 FITZRY J	118 410 SMARCHSS	118 1	0.26308	103.3	172.8		CONTINGENCY	X523A+W6MC?
673.5	402 NQL J	118 410 SMARCHSS	118 1	-0.26308	-101.1	172.8		CONTINGENCY	X523A+W6MC?
714.9 *	INTERFACE MOSES-STLAW				1.23039	394.8	781.0	CONTINGENCY	X523A+T2?
719.9 *	1107 ST LAWRE	220 1109 STLAWR34	230 34	-0.54906	-279.9	455.0		CONTINGENCY	ONE_POLE+T1
720.5	1107 ST LAWRE	220 1178 RAISNJ24	220 1	1.08197	545.3	891.0		CONTINGENCY	BOTH_POLES
723.8	327 ARNP JW6	118 392 MISSIS J	118 1	0.16471	132.8	186.0		CONTINGENCY	B31L+L24A?
724.7	103 HAWTHORN	220 1178 RAISNJ24	220 1	-1.08197	-540.7	891.0		CONTINGENCY	BOTH_POLES
741.1	366 FITZRY J	118 410 SMARCHSS	118 1	0.19836	105.3	172.8		CONTINGENCY	W6MC
745.6	326 ARNP JC7	118 366 FITZRY J	118 1	0.26308	55.9	146.6		CONTINGENCY	X523A+W6MC?
752.1	402 NQL J	118 410 SMARCHSS	118 1	-0.19836	-103.2	172.8		CONTINGENCY	W6MC
752.9	1107 ST LAWRE	220 1178 RAISNJ24	220 1	1.30933	430.3	891.0		CONTINGENCY	B31L
753.7	1107 ST LAWRE	220 1178 RAISNJ24	220 1	1.30930	429.2	891.0		CONTINGENCY	B5D
756.4	103 HAWTHORN	220 1178 RAISNJ24	220 1	-1.30933	-425.7	891.0		CONTINGENCY	B31L
757.2	103 HAWTHORN	220 1178 RAISNJ24	220 1	-1.30931	-424.6	891.0		CONTINGENCY	B5D
764.1	1107 ST LAWRE	220 1178 RAISNJ24	220 1	1.08197	340.1	733.0		BASE CASE	
768.3	103 HAWTHORN	220 1178 RAISNJ24	220 1	-1.08197	-335.5	733.0		BASE CASE	
768.5	376 BRIDLWDJ	118 425 MARCHWDJ	118 1	-0.19805	-89.1	161.9		CONTINGENCY	C7BM
771.5	327 ARNP JW6	118 392 MISSIS J	118 1	0.17942	119.5	186.0		CONTINGENCY	X523A+T2?
771.6	327 ARNP JW6	118 392 MISSIS J	118 1	0.17942	119.5	186.0		CONTINGENCY	X522A+T3?
773.2 *	1107 ST LAWRE	220 1178 RAISNJ24	220 1	1.30934	403.7	891.0		CONTINGENCY	B5D+D5A?
774.5 *	327 ARNP JW6	118 392 MISSIS J	118 1	0.17878	119.2	186.0		CONTINGENCY	X523A+T2?
776.7 *	103 HAWTHORN	220 1178 RAISNJ24	220 1	-1.30936	-399.1	891.0		CONTINGENCY	B5D+D5A?

HEAVYLOADIMPORT NONE----- 4LB7N3LK3D4B4P3LX heavyloadimportexport.txt

TOTALS FOR INTERFACE FIOCLOSED 1.00000 470.0

TOTAL TRANS	LIMITING ELEMENT				DISTR.	PRE-SHIFT	RATING	CONTINGENCY DESCR	
CAPAB	FROM	TO	CKT	FACTOR	MW	BAS/CNT	A/B		
-207.0	1107 ST LAWRE	220 1108 STLAWR33	220 33	-0.07870	-379.3	326.0		CONTINGENCY	L34P+4UGR
-23.2	1107 ST LAWRE	220 1108 STLAWR33	220 33	-0.04943	-350.4	326.0		CONTINGENCY	BOTH_POLES
700.5	1107 ST LAWRE	220 1108 STLAWR33	220 33	-0.07870	-307.9	326.0		CONTINGENCY	L34P
1102.5	392 MISSIS J	118 425 MARCHWDJ	118 1	0.02033	149.0	161.9		CONTINGENCY	C7BM
1112.4	INTERFACE MOSES-STLAW				0.10263	715.1	781.0	CONTINGENCY	BOTH_POLES
1175.6	1107 ST LAWRE	220 1108 STLAWR33	220 33	-0.04943	-199.1	234.0		BASE CASE	
1336.1	1107 ST LAWRE	220 1109 STLAWR34	230 34	-0.08129	-384.6	455.0		CONTINGENCY	L33P+4UGR
1434.2 *	1107 ST LAWRE	220 1108 STLAWR33	220 33	-0.05236	-275.5	326.0		CONTINGENCY	ONE_POLE+T1
1697.7	INTERFACE MOSES-STLAW				0.10263	401.0	527.0	BASE CASE	
2205.1	392 MISSIS J	118 425 MARCHWDJ	118 1	0.01690	132.6	161.9		CONTINGENCY	B31L+L24A?
2243.6	1107 ST LAWRE	220 1109 STLAWR34	230 34	-0.08129	-310.8	455.0		CONTINGENCY	L33P
2246.7	1107 ST LAWRE	220 1109 STLAWR34	230 34	-0.05320	-360.5	455.0		CONTINGENCY	BOTH_POLES
2261.9	1107 ST LAWRE	220 1109 STLAWR34	230 34	-0.05320	-197.7	293.0		BASE CASE	
2275.6	327 ARNP JW6	118 392 MISSIS J	118 1	0.02033	149.3	186.0		CONTINGENCY	C7BM
2426.4	392 MISSIS J	118 425 MARCHWDJ	118 1	0.01310	136.3	161.9		CONTINGENCY	BOTH_POLES
2506.4	INTERFACE MOSES-STLAW				0.10871	559.6	781.0	CONTINGENCY	ONE_POLE+T1
2642.5	INTERFACE MOSES-STLAW				0.10263	558.0	781.0	CONTINGENCY	ONE_POLE
2757.5	392 MISSIS J	118 425 MARCHWDJ	118 1	0.01446	128.8	161.9		CONTINGENCY	ONE_POLE+T1
2785.1 *	392 MISSIS J	118 425 MARCHWDJ	118 1	0.01842	119.3	161.9		CONTINGENCY	X522A+T3?
3043.5	366 FITZRY J	118 410 SMARCHSS	118 1	0.02700	103.3	172.8		CONTINGENCY	X523A+W6MC?
3124.6	402 NQL J	118 410 SMARCHSS	118 1	-0.02700	-101.1	172.8		CONTINGENCY	X523A+W6MC?
3528.1 *	INTERFACE MOSES-STLAW				0.12628	394.8	781.0	CONTINGENCY	X523A+T2?
3577.3 *	1107 ST LAWRE	220 1109 STLAWR34	230 34	-0.05635	-279.9	455.0		CONTINGENCY	ONE_POLE+T1
3582.7	1107 ST LAWRE	220 1178 RAISNJ24	220 1	0.11105	545.3	891.0		CONTINGENCY	BOTH_POLES
3615.6	327 ARNP JW6	118 392 MISSIS J	118 1	0.01690	132.8	186.0		CONTINGENCY	B31L+L24A?
3624.1	103 HAWTHORN	220 1178 RAISNJ24	220 1	-0.11105	-540.7	891.0		CONTINGENCY	BOTH_POLES
3783.6	366 FITZRY J	118 410 SMARCHSS	118 1	0.02036	105.3	172.8		CONTINGENCY	W6MC
3827.4	326 ARNP JC7	118 366 FITZRY J	118 1	0.02700	55.9	146.6		CONTINGENCY	X523A+W6MC?
3891.2	402 NQL J	118 410 SMARCHSS	118 1	-0.02036	-103.2	172.8		CONTINGENCY	W6MC
3898.3	1107 ST LAWRE	220 1178 RAISNJ24	220 1	0.13438	430.3	891.0		CONTINGENCY	B31L
3906.4	1107 ST LAWRE	220 1178 RAISNJ24	220 1	0.13438	429.2	891.0		CONTINGENCY	B5D
3932.4	103 HAWTHORN	220 1178 RAISNJ24	220 1	-0.13438	-425.7	891.0		CONTINGENCY	B31L
3940.6	103 HAWTHORN	220 1178 RAISNJ24	220 1	-0.13438	-424.6	891.0		CONTINGENCY	B5D
4007.9	1107 ST LAWRE	220 1178 RAISNJ24	220 1	0.11105	340.1	733.0		BASE CASE	
4049.2	103 HAWTHORN	220 1178 RAISNJ24	220 1	-0.11105	-335.5	733.0		BASE CASE	

HEAVYLOADIMPORT NONE----- 4LB7N3LK3D4B4P3LX heavyloadimportimport.txt
 TOTALS FOR INTERFACE MOSES-STLW 1.00000 401.0

TOTAL TRANS	LIMITING ELEMENT				DISTR.	PRE-SHIFT	RATING	CONTINGENCY DESCR	
CAPAB	FROM	TO	CKT	FACTOR	MW	BAS/CNT			
365.8	328 BARR CH	118 1323 ARDOCH	118 1	-0.14741	82.3	87.5	CONTINGENCY	B5QK	
347.1	328 BARR CH	118 1323 ARDOCH	118 1	-0.11184	81.5	87.5	CONTINGENCY	C6S	
340.6	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.14741	78.6	87.5	CONTINGENCY	B5QK	
313.9	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.11184	77.8	87.5	CONTINGENCY	C6S	
306.6	328 BARR CH	118 1323 ARDOCH	118 1	-0.15297	73.1	87.5	CONTINGENCY	M32S	
301.9	1355 LODGERM	118 1368 NORTHBRK	118 1	0.14741	-72.9	87.5	CONTINGENCY	B5QK	
288.2	328 BARR CH	118 1323 ARDOCH	118 1	-0.14815	70.8	87.5	CONTINGENCY	X522A+M29C?	
282.4	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.15297	69.4	87.5	CONTINGENCY	M32S	
280.2	* 328 BARR CH	118 1323 ARDOCH	118 1	-0.13386	71.3	87.5	CONTINGENCY	C27P	
270.0	103 HAWTHORN	220 121 ALBION31	220 1	-1.78562	671.0	905.0	CONTINGENCY	X523A+M30A?	
270.0	103 HAWTHORN	220 120 ALBION30	220 1	-1.78555	671.0	905.0	CONTINGENCY	X522A+M31A?	
263.1	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.14816	67.1	87.5	CONTINGENCY	X522A+M29C?	
263.0	1355 LODGERM	118 1368 NORTHBRK	118 1	0.11184	-72.1	87.5	CONTINGENCY	C6S	
252.5	* 1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.13386	67.6	87.5	CONTINGENCY	C27P	
249.8	1303 SIDNEY	118 1355 LODGERM	118 1	0.14741	-65.2	87.5	CONTINGENCY	B5QK	
245.1	1355 LODGERM	118 1368 NORTHBRK	118 1	0.15297	-63.7	87.5	CONTINGENCY	M32S	
229.5	103 HAWTHORN	220 120 ALBION30	220 1	-1.42714	660.3	905.0	CONTINGENCY	M31A	
229.5	103 HAWTHORN	220 121 ALBION31	220 1	-1.42701	660.3	905.0	CONTINGENCY	M30A	
224.7	1355 LODGERM	118 1368 NORTHBRK	118 1	0.14816	-61.4	87.5	CONTINGENCY	X522A+M29C?	
209.9	* 1355 LODGERM	118 1368 NORTHBRK	118 1	0.15297	-58.3	87.5	CONTINGENCY	C3S	
206.4	104 MERIVALE	220 121 ALBION31	220 1	1.78568	-557.5	905.0	CONTINGENCY	X523A+M30A?	
206.4	104 MERIVALE	220 120 ALBION30	220 1	1.78560	-557.5	905.0	CONTINGENCY	X522A+M31A?	
194.9	1303 SIDNEY	118 1355 LODGERM	118 1	0.15297	-56.0	87.5	CONTINGENCY	M32S	
194.2	1303 SIDNEY	118 1355 LODGERM	118 1	0.11184	-64.4	87.5	CONTINGENCY	C6S	
172.8	1303 SIDNEY	118 1355 LODGERM	118 1	0.14816	-53.7	87.5	CONTINGENCY	X522A+M29C?	
159.7	* 1303 SIDNEY	118 1355 LODGERM	118 1	0.15297	-50.6	87.5	CONTINGENCY	C3S	
150.0	104 MERIVALE	220 120 ALBION30	220 1	1.42708	-546.8	905.0	CONTINGENCY	M31A	
150.0	104 MERIVALE	220 121 ALBION31	220 1	1.42708	-546.8	905.0	CONTINGENCY	M30A	
142.9	130 EAS YJ21	220 1107 ST LAWRE	220 1	0.31227	-316.4	397.0	CONTINGENCY	L20H+L22H?	
102.7	104 MERIVALE	220 122 ALMONTE	220 1	-0.63571	106.4	296.0	CONTINGENCY	X523A+T2?	
102.4	104 MERIVALE	220 122 ALMONTE	220 1	-0.63759	105.6	296.0	CONTINGENCY	X522A+T3?	
102.3	104 MERIVALE	220 122 ALMONTE	220 1	-0.63751	105.6	296.0	CONTINGENCY	X523A+T2?	
89.1	104 MERIVALE	220 122 ALMONTE	220 1	-0.61276	104.9	296.0	CONTINGENCY	X523A+W6MC?	
88.0	* 104 MERIVALE	220 122 ALMONTE	220 1	-0.57415	116.3	296.0	CONTINGENCY	M32S	
86.9	1 HAWTHORN	500 103 HAWTHORN	220 T3	2.28413	-72.6	790.0	BASE CASE		
86.1	1 HAWTHORN	500 103 HAWTHORN	220 T2	2.27832	-72.5	790.0	BASE CASE		
67.5	132 EASTN20	220 1107 ST LAWRE	220 1	0.31208	-292.9	397.0	CONTINGENCY	L21H+L22H?	
52.0	122 ALMONTE	220 2242 WILSJ29	220 1	-0.63571	74.1	296.0	CONTINGENCY	X523A+T2?	
51.8	122 ALMONTE	220 2242 WILSJ29	220 1	-0.63759	73.4	296.0	CONTINGENCY	X522A+T3?	
51.7	122 ALMONTE	220 2242 WILSJ29	220 1	-0.63751	73.4	296.0	CONTINGENCY	X523A+T2?	
36.5	122 ALMONTE	220 2242 WILSJ29	220 1	-0.61276	72.7	296.0	CONTINGENCY	X523A+W6MC?	

HEAVYLOADIMPORT NONE----- 4LB7N3LK3D4B4P3LX heavyloadimportimport.txt
 TOTALS FOR INTERFACE FIOCLOSD 1.00000 470.0

TOTAL TRANS	LIMITING ELEMENT				DISTR.	PRE-SHIFT	RATING	CONTINGENCY DESCR	
CAPAB	FROM	TO	CKT	FACTOR	MW	BAS/CNT			
126.8	328 BARR CH	118 1323 ARDOCH	118 1	-0.01513	82.3	87.5	CONTINGENCY	B5QK	
-55.3	328 BARR CH	118 1323 ARDOCH	118 1	-0.01148	81.5	87.5	CONTINGENCY	C6S	
-118.4	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01513	78.6	87.5	CONTINGENCY	B5QK	
-378.4	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01148	77.8	87.5	CONTINGENCY	C6S	
-449.4	328 BARR CH	118 1323 ARDOCH	118 1	-0.01570	73.1	87.5	CONTINGENCY	M32S	
-495.1	1355 LODGERM	118 1368 NORTHBRK	118 1	0.01513	-72.9	87.5	CONTINGENCY	B5QK	
-629.5	328 BARR CH	118 1323 ARDOCH	118 1	-0.01521	70.8	87.5	CONTINGENCY	X522A+M29C?	
-685.6	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01570	69.4	87.5	CONTINGENCY	M32S	
-707.3	* 328 BARR CH	118 1323 ARDOCH	118 1	-0.01374	71.3	87.5	CONTINGENCY	C27P	
-806.7	103 HAWTHORN	220 121 ALBION31	220 1	-0.18327	671.0	905.0	CONTINGENCY	X523A+M30A?	
-806.8	103 HAWTHORN	220 120 ALBION30	220 1	-0.18326	671.0	905.0	CONTINGENCY	X522A+M31A?	
-873.4	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01521	67.1	87.5	CONTINGENCY	X522A+M29C?	
-875.0	1355 LODGERM	118 1368 NORTHBRK	118 1	0.01148	-72.1	87.5	CONTINGENCY	C6S	
-977.3	* 1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01374	67.6	87.5	CONTINGENCY	C27P	
-1003.2	1303 SIDNEY	118 1355 LODGERM	118 1	0.01513	-65.2	87.5	CONTINGENCY	B5QK	
-1048.6	1355 LODGERM	118 1368 NORTHBRK	118 1	0.01570	-63.7	87.5	CONTINGENCY	M32S	
-1200.6	103 HAWTHORN	220 120 ALBION30	220 1	-0.14647	660.3	905.0	CONTINGENCY	M31A	
-1200.8	103 HAWTHORN	220 121 ALBION31	220 1	-0.14646	660.3	905.0	CONTINGENCY	M30A	
-1248.2	1355 LODGERM	118 1368 NORTHBRK	118 1	0.01521	-61.4	87.5	CONTINGENCY	X522A+M29C?	
-1391.6	* 1355 LODGERM	118 1368 NORTHBRK	118 1	0.01570	-58.3	87.5	CONTINGENCY	C3S	
-1426.2	104 MERIVALE	220 121 ALBION31	220 1	0.18327	-557.5	905.0	CONTINGENCY	X523A+M30A?	
-1426.2	104 MERIVALE	220 120 ALBION30	220 1	0.18326	-557.5	905.0	CONTINGENCY	X522A+M31A?	
-1538.3	1303 SIDNEY	118 1355 LODGERM	118 1	0.01570	-56.0	87.5	CONTINGENCY	M32S	
-1544.7	1303 SIDNEY	118 1355 LODGERM	118 1	0.01148	-64.4	87.5	CONTINGENCY	C6S	
-1753.7	1303 SIDNEY	118 1355 LODGERM	118 1	0.01521	-53.7	87.5	CONTINGENCY	X522A+M29C?	
-1881.3	* 1303 SIDNEY	118 1355 LODGERM	118 1	0.01570	-50.6	87.5	CONTINGENCY	C3S	
-1975.8	104 MERIVALE	220 120 ALBION30	220 1	0.14647	-546.8	905.0	CONTINGENCY	M31A	
-1975.9	104 MERIVALE	220 121 ALBION31	220 1	0.14647	-546.8	905.0	CONTINGENCY	M30A	
-2045.2	130 EAS YJ21	220 1107 ST LAWRE	220 1	0.03205	-316.4	397.0	CONTINGENCY	L20H+L22H?	
-2436.4	104 MERIVALE	220 122 ALMONTE	220 1	-0.06525	106.4	296.0	CONTINGENCY	X523A+T2?	
-2439.7	104 MERIVALE	220 122 ALMONTE	220 1	-0.06544	105.6	296.0	CONTINGENCY	X522A+T3?	
-2440.2	104 MERIVALE	220 122 ALMONTE	220 1	-0.06543	105.6	296.0	CONTINGENCY	X523A+T2?	
-2568.5	104 MERIVALE	220 122 ALMONTE	220 1	-0.06289	104.9	296.0	CONTINGENCY	X523A+W6MC?	
-2580.1	* 104 MERIVALE	220 122 ALMONTE	220 1	-0.05893	116.3	296.0	CONTINGENCY	M32S	
-2590.2	1 HAWTHORN	500 103 HAWTHORN	220 T3	0.23443	-72.6	790.0	BASE CASE		

LIGHTLOADNOTTRANSFER NONE----- 4LB7N3LK3D4B4P3LX lightloadnottransferexport.tx
 TOTALS FOR INTERFACE MOSES-STLAW 1.00000 6.1

TOTAL TRANS	CAPAB	FROM	LIMITING ELEMENT	TO	CKT	DISTR. FACTOR	PRE-SHIFT MW	RATING BAS/CNT A/B	CONTINGENCY	DESCRI
-9.6	392	MISSIS J	118	425	MARCHWDJ	118 1	0.18543	164.8	161.9	CONTINGENCY C7BM
76.1	366	FITZRY J	118	410	SMARCHSS	118 1	0.24604	155.6	172.8	CONTINGENCY X523A+W6MC?
87.7	402	NQL J	118	410	SMARCHSS	118 1	-0.24604	-152.7	172.8	CONTINGENCY X523A+W6MC?
96.3	366	FITZRY J	118	410	SMARCHSS	118 1	0.18571	156.1	172.8	CONTINGENCY W6MC
111.6	402	NQL J	118	410	SMARCHSS	118 1	-0.18571	-153.2	172.8	CONTINGENCY W6MC
118.8	327	ARNP JW6	118	392	MISSIS J	118 1	0.18543	165.1	186.0	CONTINGENCY C7BM
120.0	376	BRIDLWDJ	118	425	MARCHWDJ	118 1	-0.18543	-140.8	161.9	CONTINGENCY C7BM
154.8	392	MISSIS J	118	425	MARCHWDJ	118 1	0.15465	138.9	161.9	CONTINGENCY B31L+L24A?
161.7	326	ARNP JC7	118	366	FITZRY J	118 1	0.24604	108.3	146.6	CONTINGENCY X523A+W6MC?
189.9	392	MISSIS J	118	425	MARCHWDJ	118 1	0.11949	129.0	151.0	BASE CASE
192.9	308	MER AID1	118	376	BRIDLWDJ	118 1	-0.18543	-127.3	161.9	CONTINGENCY C7BM
204.2	392	MISSIS J	118	425	MARCHWDJ	118 1	0.16779	128.7	161.9	CONTINGENCY X522A+T3?
204.3	* 392	MISSIS J	118	425	MARCHWDJ	118 1	0.16776	128.7	161.9	CONTINGENCY X523A+T2?
209.8	326	ARNP JC7	118	366	FITZRY J	118 1	0.18571	108.8	146.6	CONTINGENCY W6MC
308.9	327	ARNP JW6	118	392	MISSIS J	118 1	0.15462	139.2	186.0	CONTINGENCY B31L+L24A?
310.3	376	BRIDLWDJ	118	425	MARCHWDJ	118 1	-0.15465	-114.9	161.9	CONTINGENCY B31L+L24A?
322.8	1107	ST LAWRE	220	1108	STLAWR33	220 33	-0.77879	-79.4	326.0	CONTINGENCY L34P+4UGR
346.2	327	ARNP JW6	118	392	MISSIS J	118 1	0.16779	128.9	186.0	CONTINGENCY X522A+T3?
346.3	327	ARNP JW6	118	392	MISSIS J	118 1	0.16770	128.9	186.0	CONTINGENCY X523A+T2?
347.5	376	BRIDLWDJ	118	425	MARCHWDJ	118 1	-0.16781	-104.6	161.9	CONTINGENCY X522A+T3?
347.6	376	BRIDLWDJ	118	425	MARCHWDJ	118 1	-0.16774	-104.6	161.9	CONTINGENCY X523A+T2?
348.5	* 327	ARNP JW6	118	392	MISSIS J	118 1	0.16717	128.8	186.0	CONTINGENCY X523A+T2?
349.8	* 376	BRIDLWDJ	118	425	MARCHWDJ	118 1	-0.16717	-104.4	161.9	CONTINGENCY X523A+T2?
372.7	326	ARNP JC7	118	328	BARR CH	118 1	-0.20292	-87.5	161.9	CONTINGENCY X523A+W6MC?
375.1	366	FITZRY J	118	410	SMARCHSS	118 1	0.15516	115.6	172.8	CONTINGENCY B31L+L24A?
387.7	1	HAWTHORN	500	103	HAWTHORN	220 T3	2.13393	-24.2	790.0	BASE CASE
388.6	1	HAWTHORN	500	103	HAWTHORN	220 T2	2.12850	-24.2	790.0	BASE CASE
393.4	402	NQL J	118	410	SMARCHSS	118 1	-0.15516	-112.7	172.8	CONTINGENCY B31L+L24A?
397.6	308	MER AID1	118	376	BRIDLWDJ	118 1	-0.15465	-101.4	161.9	CONTINGENCY B31L+L24A?
407.2	366	FITZRY J	118	410	SMARCHSS	118 1	0.16836	105.3	172.8	CONTINGENCY X522A+T3?
407.3	* 366	FITZRY J	118	410	SMARCHSS	118 1	0.16833	105.3	172.8	CONTINGENCY X523A+T2?
420.1	308	MER AID1	118	402	NQL J	118 1	-0.23326	-111.2	207.8	CONTINGENCY X523A+W6MC?
421.8	1107	ST LAWRE	220	1108	STLAWR33	220 33	-0.77879	-2.2	326.0	CONTINGENCY L34P
424.1	402	NQL J	118	410	SMARCHSS	118 1	-0.16836	-102.4	172.8	CONTINGENCY X522A+T3?
424.2	* 402	NQL J	118	410	SMARCHSS	118 1	-0.16833	-102.4	172.8	CONTINGENCY X523A+T2?
428.1	308	MER AID1	118	376	BRIDLWDJ	118 1	-0.16779	-91.1	161.9	CONTINGENCY X522A+T3?
428.1	308	MER AID1	118	376	BRIDLWDJ	118 1	-0.16776	-91.1	161.9	CONTINGENCY X523A+T2?
428.9	1107	ST LAWRE	220	1178	RAISNJ24	220 1	1.03729	294.5	733.0	BASE CASE
429.8	1107	ST LAWRE	220	1178	RAISNJ24	220 1	1.25205	360.6	891.0	CONTINGENCY B31L
430.3	1107	ST LAWRE	220	1178	RAISNJ24	220 1	1.25202	360.0	891.0	CONTINGENCY B5D
430.3	* 308	MER AID1	118	376	BRIDLWDJ	118 1	-0.17113	-89.3	161.9	CONTINGENCY X522A+M29C?

LIGHTLOADNOTTRANSFER NONE----- 4LB7N3LK3D4B4P3LX lightloadnottransferexport.tx
 TOTALS FOR INTERFACE FIOCLOSD 1.00000 575.9

TOTAL TRANS	CAPAB	FROM	LIMITING ELEMENT	TO	CKT	DISTR. FACTOR	PRE-SHIFT MW	RATING BAS/CNT A/B	CONTINGENCY	DESCRI
431.8	392	MISSIS J	118	425	MARCHWDJ	118 1	0.02028	164.8	161.9	CONTINGENCY C7BM
1215.3	366	FITZRY J	118	410	SMARCHSS	118 1	0.02692	155.6	172.8	CONTINGENCY X523A+W6MC?
1321.2	402	NQL J	118	410	SMARCHSS	118 1	-0.02692	-152.7	172.8	CONTINGENCY X523A+W6MC?
1400.2	366	FITZRY J	118	410	SMARCHSS	118 1	0.02032	156.1	172.8	CONTINGENCY W6MC
1540.5	402	NQL J	118	410	SMARCHSS	118 1	-0.02032	-153.2	172.8	CONTINGENCY W6MC
1605.8	327	ARNP JW6	118	392	MISSIS J	118 1	0.02028	165.1	186.0	CONTINGENCY C7BM
1617.0	376	BRIDLWDJ	118	425	MARCHWDJ	118 1	-0.02028	-140.8	161.9	CONTINGENCY C7BM
1935.2	392	MISSIS J	118	425	MARCHWDJ	118 1	0.01692	138.9	161.9	CONTINGENCY B31L+L24A?
1998.1	326	ARNP JC7	118	366	FITZRY J	118 1	0.02692	108.3	146.6	CONTINGENCY X523A+W6MC?
2255.6	392	MISSIS J	118	425	MARCHWDJ	118 1	0.01307	129.0	151.0	BASE CASE
2283.0	308	MER AID1	118	376	BRIDLWDJ	118 1	-0.02028	-127.3	161.9	CONTINGENCY C7BM
2387.0	392	MISSIS J	118	425	MARCHWDJ	118 1	0.01836	128.7	161.9	CONTINGENCY X522A+T3?
2387.2	* 392	MISSIS J	118	425	MARCHWDJ	118 1	0.01835	128.7	161.9	CONTINGENCY X523A+T2?
2437.4	326	ARNP JC7	118	366	FITZRY J	118 1	0.02032	108.8	146.6	CONTINGENCY W6MC
3343.4	327	ARNP JW6	118	392	MISSIS J	118 1	0.01691	139.2	186.0	CONTINGENCY B31L+L24A?
3356.3	376	BRIDLWDJ	118	425	MARCHWDJ	118 1	-0.01692	-114.9	161.9	CONTINGENCY B31L+L24A?
3470.9	1107	ST LAWRE	220	1108	STLAWR33	220 33	-0.08519	-79.4	326.0	CONTINGENCY L34P+4UGR
3684.4	327	ARNP JW6	118	392	MISSIS J	118 1	0.01836	128.9	186.0	CONTINGENCY X522A+T3?
3686.0	327	ARNP JW6	118	392	MISSIS J	118 1	0.01835	128.9	186.0	CONTINGENCY X523A+T2?
3696.4	376	BRIDLWDJ	118	425	MARCHWDJ	118 1	-0.01836	-104.6	161.9	CONTINGENCY X522A+T3?
3697.6	376	BRIDLWDJ	118	425	MARCHWDJ	118 1	-0.01835	-104.6	161.9	CONTINGENCY X523A+T2?
3705.5	* 327	ARNP JW6	118	392	MISSIS J	118 1	0.01829	128.8	186.0	CONTINGENCY X523A+T2?
3717.9	* 376	BRIDLWDJ	118	425	MARCHWDJ	118 1	-0.01829	-104.4	161.9	CONTINGENCY X523A+T2?
3926.7	326	ARNP JC7	118	328	BARR CH	118 1	-0.02220	-87.5	161.9	CONTINGENCY X523A+W6MC?
3948.5	366	FITZRY J	118	410	SMARCHSS	118 1	0.01697	115.6	172.8	CONTINGENCY B31L+L24A?
4063.6	1	HAWTHORN	500	103	HAWTHORN	220 T3	0.23344	-24.2	790.0	BASE CASE
4072.6	1	HAWTHORN	500	103	HAWTHORN	220 T2	0.23284	-24.2	790.0	BASE CASE
4116.5	402	NQL J	118	410	SMARCHSS	118 1	-0.01697	-112.7	172.8	CONTINGENCY B31L+L24A?
4154.9	308	MER AID1	118	376	BRIDLWDJ	118 1	-0.01692	-101.4	161.9	CONTINGENCY B31L+L24A?
4242.4	366	FITZRY J	118	410	SMARCHSS	118 1	0.01842	105.3	172.8	CONTINGENCY X522A+T3?
4242.8	* 366	FITZRY J	118	410	SMARCHSS	118 1	0.01841	105.3	172.8	CONTINGENCY X523A+T2?
4360.0	308	MER AID1	118	402	NQL J	118 1	-0.02552	-111.2	207.8	CONTINGENCY X523A+W6MC?
4376.2	1107	ST LAWRE	220	1108	STLAWR33	220 33	-0.08519	-2.2	326.0	CONTINGENCY L34P
4397.2	402	NQL J	118	410	SMARCHSS	118 1	-0.01842	-102.4	172.8	CONTINGENCY X522A+T3?
4397.8	* 402	NQL J	118	410	SMARCHSS	118 1	-0.01841	-102.4	172.8	CONTINGENCY X523A+T2?

LIGHTLOADNOTTRANSFER NONE----- 4LB7N3LK3D4B4P3LX lightloadnottransferimport.tx
 TOTALS FOR INTERFACE MOSES-STLW 1.00000 6.1

TOTAL TRANS CAPAB	----->	----->	----->	----->	----->	DISTR.	PRE-SHIFT	RATING	----->	----->	----->
	FROM	TO	CKT	FACTOR	MW	BAS/CNT		A/B	CONTINGENCY	DESCRI	
-50.6	328 BARR CH	118 1323 ARDOCH	118 1	-0.13782	79.7	87.5	CONTINGENCY	B5QK			
-70.4	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.13782	77.0	87.5	CONTINGENCY	B5QK			
-94.5	1355 LODGERM	118 1368 NORTHBRK	118 1	0.13782	-73.6	87.5	CONTINGENCY	B5QK			
-104.1	328 BARR CH	118 1323 ARDOCH	118 1	-0.10137	76.3	87.5	CONTINGENCY	X523A+W6MC?			
-126.5	1303 SIDNEY	118 1355 LODGERM	118 1	0.13782	-69.2	87.5	CONTINGENCY	B5QK			
-130.9	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.10137	73.6	87.5	CONTINGENCY	X523A+W6MC?			
-163.8	1355 LODGERM	118 1368 NORTHBRK	118 1	0.10137	-70.3	87.5	CONTINGENCY	X523A+W6MC?			
-176.5	328 BARR CH	118 1323 ARDOCH	118 1	-0.13819	62.3	87.5	CONTINGENCY	X522A+M29C?			
-178.6	328 BARR CH	118 1323 ARDOCH	118 1	-0.14277	61.1	87.5	CONTINGENCY	M32S			
-191.3	* 328 BARR CH	118 1323 ARDOCH	118 1	-0.13410	61.0	87.5	CONTINGENCY	X523A+T2?			
-196.2	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.13818	59.5	87.5	CONTINGENCY	X522A+M29C?			
-197.6	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.14277	58.4	87.5	CONTINGENCY	M32S			
-207.3	1303 SIDNEY	118 1355 LODGERM	118 1	0.10137	-65.9	87.5	CONTINGENCY	X523A+W6MC?			
-211.6	* 1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.13410	58.3	87.5	CONTINGENCY	X523A+T2?			
-220.3	1355 LODGERM	118 1368 NORTHBRK	118 1	0.13819	-56.2	87.5	CONTINGENCY	X522A+M29C?			
-221.0	1355 LODGERM	118 1368 NORTHBRK	118 1	0.14277	-55.1	87.5	CONTINGENCY	M32S			
-236.0	* 1355 LODGERM	118 1368 NORTHBRK	118 1	0.14277	-52.9	87.5	CONTINGENCY	C3S			
-251.9	1303 SIDNEY	118 1355 LODGERM	118 1	0.14277	-50.7	87.5	CONTINGENCY	M32S			
-252.2	1303 SIDNEY	118 1355 LODGERM	118 1	0.13819	-51.8	87.5	CONTINGENCY	X522A+M29C?			
-266.9	* 1303 SIDNEY	118 1355 LODGERM	118 1	0.14277	-48.5	87.5	CONTINGENCY	C3S			
-352.8	1 HAWTHORN	500 103 HAWTHORN	220 T3	2.13393	-24.2	790.0	BASE CASE				
-353.7	1 HAWTHORN	500 103 HAWTHORN	220 T2	2.12850	-24.2	790.0	BASE CASE				
-354.0	104 MERIVALE	220 122 ALMONTE	220 1	-0.59470	81.8	296.0	CONTINGENCY	X522A+T3?			
-354.1	104 MERIVALE	220 122 ALMONTE	220 1	-0.59463	81.8	296.0	CONTINGENCY	X523A+T2?			
-354.3	104 MERIVALE	220 122 ALMONTE	220 1	-0.59296	82.3	296.0	CONTINGENCY	X523A+T2?			
-370.7	104 MERIVALE	220 122 ALMONTE	220 1	-0.56815	81.9	296.0	CONTINGENCY	X552A+T51?			
-371.0	* 104 MERIVALE	220 122 ALMONTE	220 1	-0.56745	82.0	296.0	CONTINGENCY	X523A			
-373.2	122 ALMONTE	220 2242 WILSJ29	220 1	-0.59471	70.4	296.0	CONTINGENCY	X522A+T3?			
-373.3	122 ALMONTE	220 2242 WILSJ29	220 1	-0.59462	70.4	296.0	CONTINGENCY	X523A+T2?			
-373.5	122 ALMONTE	220 2242 WILSJ29	220 1	-0.59296	70.9	296.0	CONTINGENCY	X523A+T2?			
-390.7	122 ALMONTE	220 2242 WILSJ29	220 1	-0.56816	70.5	296.0	CONTINGENCY	X552A+T51?			
-391.1	* 122 ALMONTE	220 2242 WILSJ29	220 1	-0.56745	70.6	296.0	CONTINGENCY	X523A			
-415.3	1107 ST LAWRE	220 1108 STLAWR33	220 33	-0.77879	-2.2	326.0	CONTINGENCY	L34P			
-448.1	328 BARR CH	118 1375 SHARBT J	118 1	-0.17423	95.9	175.0	CONTINGENCY	B1S			
-449.2	100 CHAT FLS	220 1161 MARINJ28	220 1	-0.45912	84.9	294.0	CONTINGENCY	X522A+M29C?			
-455.3	100 CHAT FLS	220 1149 HAVELK26	220 1	-0.46160	81.0	294.0	CONTINGENCY	X522A+M29C?			
-455.8	103 HAWTHORN	220 120 ALBION30	220 1	-1.66736	134.8	905.0	CONTINGENCY	X522A+M31A?			
-455.8	103 HAWTHORN	220 121 ALBION31	220 1	-1.66736	134.8	905.0	CONTINGENCY	X523A+M30A?			
-462.8	1 HAWTHORN	500 103 HAWTHORN	220 T3	3.06301	-31.6	1468.0	CONTINGENCY	HAW-T2			
-463.1	1149 HAVELK26	220 1163 MARINJ26	220 1	-0.46158	81.0	297.6	CONTINGENCY	X522A+M29C?			
-463.6	1 HAWTHORN	500 103 HAWTHORN	220 T2	3.05813	-31.6	1468.0	CONTINGENCY	HAW-T3			

LIGHTLOADNOTTRANSFER NONE----- 4LB7N3LK3D4B4P3LX lightloadnottransferimport.txt
 TOTALS FOR INTERFACE FIOCLOSD 1.00000 575.9

TOTAL TRANS CAPAB	----->	----->	----->	----->	----->	DISTR.	PRE-SHIFT	RATING	----->	----->	----->
	FROM	TO	CKT	FACTOR	MW	BAS/CNT		A/B	CONTINGENCY	DESCRI	
57.3	328 BARR CH	118 1323 ARDOCH	118 1	-0.01508	79.7	87.5	CONTINGENCY	B5QK			
-123.3	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01508	77.0	87.5	CONTINGENCY	B5QK			
-344.2	1355 LODGERM	118 1368 NORTHBRK	118 1	0.01508	-73.6	87.5	CONTINGENCY	B5QK			
-431.5	328 BARR CH	118 1323 ARDOCH	118 1	-0.01109	76.3	87.5	CONTINGENCY	X523A+W6MC?			
-636.8	1303 SIDNEY	118 1355 LODGERM	118 1	0.01508	-69.2	87.5	CONTINGENCY	B5QK			
-677.1	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01109	73.6	87.5	CONTINGENCY	X523A+W6MC?			
-977.5	1355 LODGERM	118 1368 NORTHBRK	118 1	0.01109	-70.3	87.5	CONTINGENCY	X523A+W6MC?			
-1093.2	328 BARR CH	118 1323 ARDOCH	118 1	-0.01512	62.3	87.5	CONTINGENCY	X522A+M29C?			
-1112.5	328 BARR CH	118 1323 ARDOCH	118 1	-0.01562	61.1	87.5	CONTINGENCY	M32S			
-1228.6	* 328 BARR CH	118 1323 ARDOCH	118 1	-0.01467	61.0	87.5	CONTINGENCY	X523A+T2?			
-1273.4	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01512	59.5	87.5	CONTINGENCY	X522A+M29C?			
-1286.8	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01562	58.4	87.5	CONTINGENCY	M32S			
-1375.2	1303 SIDNEY	118 1355 LODGERM	118 1	0.01109	-65.9	87.5	CONTINGENCY	X523A+W6MC?			
-1414.2	* 1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01467	58.3	87.5	CONTINGENCY	X523A+T2?			
-1493.7	1355 LODGERM	118 1368 NORTHBRK	118 1	0.01512	-56.2	87.5	CONTINGENCY	X522A+M29C?			
-1500.2	1355 LODGERM	118 1368 NORTHBRK	118 1	0.01562	-55.1	87.5	CONTINGENCY	M32S			
-1637.7	* 1355 LODGERM	118 1368 NORTHBRK	118 1	0.01562	-52.9	87.5	CONTINGENCY	C3S			
-1782.5	1303 SIDNEY	118 1355 LODGERM	118 1	0.01562	-50.7	87.5	CONTINGENCY	M32S			
-1785.5	1303 SIDNEY	118 1355 LODGERM	118 1	0.01512	-51.8	87.5	CONTINGENCY	X522A+M29C?			
-1920.1	* 1303 SIDNEY	118 1355 LODGERM	118 1	0.01562	-48.5	87.5	CONTINGENCY	C3S			
-2704.8	1 HAWTHORN	500 103 HAWTHORN	220 T3	0.23344	-24.2	790.0	BASE CASE				
-2713.1	1 HAWTHORN	500 103 HAWTHORN	220 T2	0.23284	-24.2	790.0	BASE CASE				
-2716.4	104 MERIVALE	220 122 ALMONTE	220 1	-0.06506	81.8	296.0	CONTINGENCY	X522A+T3?			
-2716.9	104 MERIVALE	220 122 ALMONTE	220 1	-0.06505	81.8	296.0	CONTINGENCY	X523A+T2?			
-2718.6	104 MERIVALE	220 122 ALMONTE	220 1	-0.06487	82.3	296.0	CONTINGENCY	X523A+T2?			
-2868.4	104 MERIVALE	220 122 ALMONTE	220 1	-0.06215	81.9	296.0	CONTINGENCY	X552A+T51?			
-2871.4	* 104 MERIVALE	220 122 ALMONTE	220 1	-0.06207	82.0	296.0	CONTINGENCY	X523A			
-2891.6	122 ALMONTE	220 2242 WILSJ29	220 1	-0.06506	70.4	296.0	CONTINGENCY	X522A+T3?			
-2892.2	122 ALMONTE	220 2242 WILSJ29	220 1	-0.06505	70.4	296.0	CONTINGENCY	X523A+T2?			
-2894.4	122 ALMONTE	220 2242 WILSJ29	220 1	-0.06487	70.9	296.0	CONTINGENCY	X523A+T2?			
-3051.8	122 ALMONTE	220 2242 WILSJ29	220 1	-0.06215	70.5	296.0	CONTINGENCY	X552A+T51?			
-3055.1	* 122 ALMONTE	220 2242 WILSJ29	220 1	-0.06207	70.6	296.0	CONTINGENCY	X523A			
-3276.9	1107 ST LAWRE	220 1108 STLAWR33	220 33	-0.08519	-2.2	326.0	CONTINGENCY	L34P			
-3575.9	328 BARR CH	118 1375 SHARBT J	118 1	-0.01906	95.9	175.0	CONTINGENCY	B1S			
-3586.4	100 CHAT FLS	220 1161 MARINJ28	220 1	-0.05022	84.9	294.0	CONTINGENCY	X522A+M29C?			

LIGHTLOADEXPORT NONE----- 4LB8N3LK3D4B4P3LX lightloadexportexport.txt
 TOTALS FOR INTERFACE MOSES-STLW 1.00000 -361.4

TOTAL TRANS CAPAB	-----	LIMITING	ELEMENT	-----	DISTR.	PRE-SHIFT	RATING	-----	CONTINGENCY	DESCRI	
	FROM			TO	FACTOR	MW	BAS/CNT				
-497.2	392	MISSIS J	118	425	MARCHWDJ	118	1	0.21120	190.6	161.9	CONTINGENCY C7BM
-425.6	366	FITZRY J	118	410	SMARCHSS	118	1	0.28082	190.8	172.8	CONTINGENCY X523A+W6MC?
-412.1	402	NQL J	118	410	SMARCHSS	118	1	-0.28082	-187.0	172.8	CONTINGENCY X523A+W6MC?
-398.5	366	FITZRY J	118	410	SMARCHSS	118	1	0.21152	180.6	172.8	CONTINGENCY W6MC
-384.9	327	ARNP JW6	118	392	MISSIS J	118	1	0.21121	191.0	186.0	CONTINGENCY C7BM
-380.5	402	NQL J	118	410	SMARCHSS	118	1	-0.21152	-176.8	172.8	CONTINGENCY W6MC
-377.5	376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.21121	-165.3	161.9	CONTINGENCY C7BM
-351.6	326	ARNP JC7	118	366	FITZRY J	118	1	0.28082	143.9	146.6	CONTINGENCY X523A+W6MC?
-324.8	392	MISSIS J	118	425	MARCHWDJ	118	1	0.17516	155.5	161.9	CONTINGENCY B31L+L24A?
-322.6	392	MISSIS J	118	425	MARCHWDJ	118	1	0.13610	145.7	151.0	BASE CASE
-318.5	392	MISSIS J	118	425	MARCHWDJ	118	1	0.19160	153.7	161.9	CONTINGENCY X522A+T3?
-318.5	392	MISSIS J	118	425	MARCHWDJ	118	1	0.19157	153.7	161.9	CONTINGENCY X523A+T2?
-312.3	308	MER AID1	118	376	BRIDLWDJ	118	1	-0.21121	-151.5	161.9	CONTINGENCY C7BM
-300.2	326	ARNP JC7	118	366	FITZRY J	118	1	0.21152	133.7	146.6	CONTINGENCY W6MC
-194.8	327	ARNP JW6	118	392	MISSIS J	118	1	0.19163	154.1	186.0	CONTINGENCY X522A+T3?
-194.7	327	ARNP JW6	118	392	MISSIS J	118	1	0.19153	154.1	186.0	CONTINGENCY X523A+T2?
-193.5	327	ARNP JW6	118	392	MISSIS J	118	1	0.19088	154.0	186.0	CONTINGENCY X523A+T2?
-190.6	327	ARNP JW6	118	392	MISSIS J	118	1	0.19552	152.6	186.0	CONTINGENCY X522A+M29C?
-186.5	376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.19161	-128.4	161.9	CONTINGENCY X522A+T3?
-186.5	376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.19161	-128.4	161.9	CONTINGENCY X523A+T2?
-185.3	376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.19088	-128.3	161.9	CONTINGENCY X523A+T2?
-182.4	376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.19543	-126.9	161.9	CONTINGENCY X522A+M29C?
-180.9	1	HAWTHORN	500	103	HAWTHORN	220	T3	2.44277	349.1	790.0	BASE CASE
-180.0	1	HAWTHORN	500	103	HAWTHORN	220	T2	2.43656	348.2	790.0	BASE CASE
-172.6	326	ARNP JC7	118	328	BARR CH	118	1	-0.23161	-118.2	161.9	CONTINGENCY X523A+W6MC?
-138.2	366	FITZRY J	118	410	SMARCHSS	118	1	0.19225	129.9	172.8	CONTINGENCY X522A+T3?
-138.1	366	FITZRY J	118	410	SMARCHSS	118	1	0.19220	129.9	172.8	CONTINGENCY X523A+T2?
-136.8	366	FITZRY J	118	410	SMARCHSS	118	1	0.19152	129.8	172.8	CONTINGENCY X523A+T2?
-119.1	308	MER AID1	118	402	NQL J	118	1	-0.26623	-143.3	207.8	CONTINGENCY X523A+W6MC?
-118.4	402	NQL J	118	410	SMARCHSS	118	1	-0.19225	-126.1	172.8	CONTINGENCY X522A+T3?
-118.4	402	NQL J	118	410	SMARCHSS	118	1	-0.19221	-126.1	172.8	CONTINGENCY X523A+T2?
-116.9	402	NQL J	118	410	SMARCHSS	118	1	-0.19152	-126.0	172.8	CONTINGENCY X523A+T2?
-114.7	308	MER AID1	118	376	BRIDLWDJ	118	1	-0.19159	-114.6	161.9	CONTINGENCY X522A+T3?
-114.6	308	MER AID1	118	376	BRIDLWDJ	118	1	-0.19154	-114.6	161.9	CONTINGENCY X523A+T2?
-113.2	308	MER AID1	118	376	BRIDLWDJ	118	1	-0.19088	-114.5	161.9	CONTINGENCY X523A+T2?
-112.1	308	MER AID1	118	376	BRIDLWDJ	118	1	-0.19546	-113.2	161.9	CONTINGENCY X522A+M29C?
-86.0	1	HAWTHORN	500	103	HAWTHORN	220	T3	3.50816	502.2	1468.0	CONTINGENCY HAW-T2
-85.4	1	HAWTHORN	500	103	HAWTHORN	220	T2	3.50254	501.3	1468.0	CONTINGENCY HAW-T3
-77.9	1	HAWTHORN	500	103	HAWTHORN	220	T3	3.44319	492.2	1468.0	CONTINGENCY HAW-T1
-77.5	1	HAWTHORN	500	103	HAWTHORN	220	T1	2.18822	312.8	934.0	BASE CASE
-76.8	1	HAWTHORN	500	103	HAWTHORN	220	T2	3.43443	490.8	1468.0	CONTINGENCY HAW-T1

LIGHTLOADEXPORT NONE----- 4LB8N3LK3D4B4P3LX lightloadexportexport.txt
 TOTALS FOR INTERFACE FIOCLOSD 1.00000 1842.8

TOTAL TRANS CAPAB	-----	LIMITING	ELEMENT	-----	DISTR.	PRE-SHIFT	RATING	-----	CONTINGENCY	DESCRI	
	FROM			TO	FACTOR	MW	BAS/CNT				
432.7	392	MISSIS J	118	425	MARCHWDJ	118	1	0.02035	190.6	161.9	CONTINGENCY C7BM
1176.0	366	FITZRY J	118	410	SMARCHSS	118	1	0.02706	190.8	172.8	CONTINGENCY X523A+W6MC?
1316.6	402	NQL J	118	410	SMARCHSS	118	1	-0.02706	-187.0	172.8	CONTINGENCY X523A+W6MC?
1457.7	366	FITZRY J	118	410	SMARCHSS	118	1	0.02038	180.6	172.8	CONTINGENCY W6MC
1598.3	327	ARNP JW6	118	392	MISSIS J	118	1	0.02035	191.0	186.0	CONTINGENCY C7BM
1644.4	402	NQL J	118	410	SMARCHSS	118	1	-0.02038	-176.8	172.8	CONTINGENCY W6MC
1675.7	376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.02035	-165.3	161.9	CONTINGENCY C7BM
1943.9	326	ARNP JC7	118	366	FITZRY J	118	1	0.02706	143.9	146.6	CONTINGENCY X523A+W6MC?
2222.3	392	MISSIS J	118	425	MARCHWDJ	118	1	0.01688	155.5	161.9	CONTINGENCY B31L+L24A?
2245.4	392	MISSIS J	118	425	MARCHWDJ	118	1	0.01311	145.7	151.0	BASE CASE
2287.3	392	MISSIS J	118	425	MARCHWDJ	118	1	0.01846	153.7	161.9	CONTINGENCY X522A+T3?
2287.5	392	MISSIS J	118	425	MARCHWDJ	118	1	0.01846	153.7	161.9	CONTINGENCY X523A+T2?
2351.7	308	MER AID1	118	376	BRIDLWDJ	118	1	-0.02035	-151.5	161.9	CONTINGENCY C7BM
2477.2	326	ARNP JC7	118	366	FITZRY J	118	1	0.02038	133.7	146.6	CONTINGENCY W6MC
3571.9	327	ARNP JW6	118	392	MISSIS J	118	1	0.01846	154.1	186.0	CONTINGENCY X522A+T3?
3572.9	327	ARNP JW6	118	392	MISSIS J	118	1	0.01845	154.1	186.0	CONTINGENCY X523A+T2?
3584.9	327	ARNP JW6	118	392	MISSIS J	118	1	0.01839	154.0	186.0	CONTINGENCY X523A+T2?
3615.4	327	ARNP JW6	118	392	MISSIS J	118	1	0.01884	152.6	186.0	CONTINGENCY X522A+M29C?
3657.3	376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.01846	-128.4	161.9	CONTINGENCY X522A+T3?
3657.5	376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.01846	-128.4	161.9	CONTINGENCY X523A+T2?
3670.5	376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.01839	-128.3	161.9	CONTINGENCY X523A+T2?
3699.8	376	BRIDLWDJ	118	425	MARCHWDJ	118	1	-0.01883	-126.9	161.9	CONTINGENCY X522A+M29C?
3715.9	1	HAWTHORN	500	103	HAWTHORN	220	T3	0.23536	349.1	790.0	BASE CASE
3724.8	1	HAWTHORN	500	103	HAWTHORN	220	T2	0.23476	348.2	790.0	BASE CASE
3802.0	326	ARNP JC7	118	328	BARR CH	118	1	-0.02232	-118.2	161.9	CONTINGENCY X523A+W6MC?
4158.9	366	FITZRY J	118	410	SMARCHSS	118	1	0.01852	129.9	172.8	CONTINGENCY X522A+T3?
4159.6	366	FITZRY J	118	410	SMARCHSS	118	1	0.01852	129.9	172.8	CONTINGENCY X523A+T2?
4173.9	366	FITZRY J	118	410	SMARCHSS	118	1	0.01845	129.8	172.8	CONTINGENCY X523A+T2?
4357.0	308	MER AID1	118	402	NQL J	118	1	-0.02565	-143.3	207.8	CONTINGENCY X523A+W6MC?
4364.3	402	NQL J	118	410	SMARCHSS	118	1	-0.01852	-126.1	172.8	CONTINGENCY X522A+T3?
4364.9	402	NQL J	118	410	SMARCHSS	118	1	-0.01852	-126.1	172.8	CONTINGENCY X523A+T2?
4380.1	402	NQL J	118	410	SMARCHSS	118	1	-0.01845	-126.0	172.8	CONTINGENCY X523A+T2?
4402.8	308	MER AID1	118	376	BRIDLWDJ	118	1	-0.01846	-114.6	161.9	CONTINGENCY X522A+T3?
4403.6	308	MER AID1	118	376	BRIDLWDJ	118	1	-0.01846	-114.6	161.9	CONTINGENCY X523A+T2?
4418.6	308	MER AID1	118	376	BRIDLWDJ	118	1	-0.01839	-114.5	161.9	CONTINGENCY X523A+T2?

LIGHTLOADEXPORT NONE----- 4LB8N3LK3D4B4P3LX lightloadexportimport.txt
 TOTALS FOR INTERFACE MOSES-STLAW 1.00000 -361.4

TOTAL TRANS	LIMITING ELEMENT				DISTR.	PRE-SHIFT	RATING	CONTINGENCY DESCR	
CAPAB	FROM	TO	CKT	FACTOR	MW	BAS/CNT	A/B		
-397.6	1107	ST LAWRE	220	1108 STLAWR33	220 33	-0.46822	309.1	326.0	CONTINGENCY BOTH_POLES
-442.6	1107	ST LAWRE	220	1108 STLAWR33	220 33	-0.72929	266.8	326.0	CONTINGENCY L34P
-487.3	INTERFACE MOSES-STLAW				1.00000	-655.1	781.0	CONTINGENCY BOTH_POLES	
-494.8	1107	ST LAWRE	220	1108 STLAWR33	220 33	-0.46822	171.5	234.0	BASE CASE
-527.0	INTERFACE MOSES-STLAW				1.00000	-361.4	527.0	BASE CASE	
-529.9	1107	ST LAWRE	220	1108 STLAWR33	220 33	-0.72928	203.1	326.0	CONTINGENCY L34P+4UGR
-537.7	328	BARR CH	118	1323 ARDOCH	118 1	-0.15743	59.7	87.5	CONTINGENCY B5QK
-539.1	1107	ST LAWRE	220	1108 STLAWR33	220 33	-0.49605	237.9	326.0	CONTINGENCY ONE_POLE+T1
-547.4	1107	ST LAWRE	220	1109 STLAWR34	230 34	-0.53178	194.1	293.0	BASE CASE
-550.1	1323	ARDOCH	118	1368 NORTHBRK	118 1	-0.15743	57.8	87.5	CONTINGENCY B5QK
-558.3	1107	ST LAWRE	220	1109 STLAWR34	230 34	-0.53178	350.3	455.0	CONTINGENCY BOTH_POLES
-567.9	1355	LODGERM	118	1368 NORTHBRK	118 1	0.15743	-55.0	87.5	CONTINGENCY B5QK
-581.9	1107	ST LAWRE	220	1109 STLAWR34	230 34	-0.77653	283.7	455.0	CONTINGENCY L33P
-590.7	328	BARR CH	118	1323 ARDOCH	118 1	-0.11639	60.8	87.5	CONTINGENCY X523A+W6MC?
-592.0	1303	SIDNEY	118	1355 LODGERM	118 1	0.15743	-51.2	87.5	CONTINGENCY B5QK
-607.5	1323	ARDOCH	118	1368 NORTHBRK	118 1	-0.11639	58.8	87.5	CONTINGENCY X523A+W6MC?
-609.6	328	BARR CH	118	1323 ARDOCH	118 1	-0.11739	58.4	87.5	CONTINGENCY BOTH_POLES
-623.7	INTERFACE MOSES-STLAW				1.05944	-503.0	781.0	CONTINGENCY ONE_POLE+T1	
-626.3	1323	ARDOCH	118	1368 NORTHBRK	118 1	-0.11739	56.4	87.5	CONTINGENCY BOTH_POLES
-631.6	1355	LODGERM	118	1368 NORTHBRK	118 1	0.11639	-56.0	87.5	CONTINGENCY X523A+W6MC?
-634.1	INTERFACE MOSES-STLAW				1.00000	-508.2	781.0	CONTINGENCY ONE_POLE	
-646.5	328	BARR CH	118	1323 ARDOCH	118 1	-0.12686	51.3	87.5	CONTINGENCY ONE_POLE+T1
-649.1	328	BARR CH	118	1323 ARDOCH	118 1	-0.16364	40.4	87.5	CONTINGENCY M32S
-650.1	1355	LODGERM	118	1368 NORTHBRK	118 1	0.11739	-53.6	87.5	CONTINGENCY BOTH_POLES
-661.1	1323	ARDOCH	118	1368 NORTHBRK	118 1	-0.16365	38.5	87.5	CONTINGENCY M32S
-661.9	1323	ARDOCH	118	1368 NORTHBRK	118 1	-0.12686	49.4	87.5	CONTINGENCY ONE_POLE+T1
-664.2	1303	SIDNEY	118	1355 LODGERM	118 1	0.11639	-52.3	87.5	CONTINGENCY X523A+W6MC?
-669.3	1107	ST LAWRE	220	1109 STLAWR34	230 34	-0.77653	215.9	455.0	CONTINGENCY L33P+4UGR
-678.2	1355	LODGERM	118	1368 NORTHBRK	118 1	0.16364	-35.7	87.5	CONTINGENCY M32S
-681.0	1355	LODGERM	118	1368 NORTHBRK	118 1	0.15856	-36.8	87.5	CONTINGENCY X522A+M29C?
-682.4	1303	SIDNEY	118	1355 LODGERM	118 1	0.11739	-49.8	87.5	CONTINGENCY BOTH_POLES
-690.8	1107	ST LAWRE	220	1109 STLAWR34	230 34	-0.56339	269.4	455.0	CONTINGENCY ONE_POLE+T1
-701.4	1303	SIDNEY	118	1355 LODGERM	118 1	0.16364	-31.9	87.5	CONTINGENCY M32S
-705.0	1303	SIDNEY	118	1355 LODGERM	118 1	0.15856	-33.0	87.5	CONTINGENCY X522A+M29C?
-709.1	INTERFACE MOSES-STLAW				1.18099	-370.4	781.0	CONTINGENCY X526B+X527B?	
-799.7	104	MERIVALE	220	122 ALMONTE	220 1	-0.52695	65.0	296.0	CONTINGENCY BOTH_POLES
-812.5	104	MERIVALE	220	122 ALMONTE	220 1	-0.68287	-12.1	296.0	CONTINGENCY X522A+T3?
-812.5	104	MERIVALE	220	122 ALMONTE	220 1	-0.68278	-12.0	296.0	CONTINGENCY X523A+T2?
-813.4	104	MERIVALE	220	122 ALMONTE	220 1	-0.68084	-11.7	296.0	CONTINGENCY X523A+T2?
-821.3	122	ALMONTE	220	2242 WLSJM29	220 1	-0.52695	53.6	296.0	CONTINGENCY BOTH_POLES
-823.2	104	MERIVALE	220	122 ALMONTE	220 1	-0.56694	34.2	296.0	CONTINGENCY ONE_POLE+T1

LIGHTLOADEXPORT NONE----- 4LB8N3LK3D4B4P3LX lightloadexportimport.txt
 TOTALS FOR INTERFACE FIOCLOSED 1.00000 1842.8

TOTAL TRANS	LIMITING ELEMENT				DISTR.	PRE-SHIFT	RATING	CONTINGENCY DESCR	
CAPAB	FROM	TO	CKT	FACTOR	MW	BAS/CNT	A/B		
1467.2	1107	ST LAWRE	220	1108 STLAWR33	220 33	-0.04511	309.1	326.0	CONTINGENCY BOTH_POLES
1000.1	1107	ST LAWRE	220	1108 STLAWR33	220 33	-0.07027	266.8	326.0	CONTINGENCY L34P
536.2	INTERFACE MOSES-STLAW				0.09635	-655.1	781.0	CONTINGENCY BOTH_POLES	
457.8	1107	ST LAWRE	220	1108 STLAWR33	220 33	-0.04511	171.5	234.0	BASE CASE
123.6	INTERFACE MOSES-STLAW				0.09635	-361.4	527.0	BASE CASE	
93.2	1107	ST LAWRE	220	1108 STLAWR33	220 33	-0.07027	203.1	326.0	CONTINGENCY L34P+4UGR
12.4	328	BARR CH	118	1323 ARDOCH	118 1	-0.01517	59.7	87.5	CONTINGENCY B5QK
-1.5	1107	ST LAWRE	220	1108 STLAWR33	220 33	-0.04779	237.9	326.0	CONTINGENCY ONE_POLE+T1
-88.2	1107	ST LAWRE	220	1109 STLAWR34	230 34	-0.05124	194.1	293.0	BASE CASE
-116.5	1323	ARDOCH	118	1368 NORTHBRK	118 1	-0.01517	57.8	87.5	CONTINGENCY B5QK
-201.2	1107	ST LAWRE	220	1109 STLAWR34	230 34	-0.05124	350.3	455.0	CONTINGENCY BOTH_POLES
-301.0	1355	LODGERM	118	1368 NORTHBRK	118 1	0.01517	-55.0	87.5	CONTINGENCY B5QK
-446.5	1107	ST LAWRE	220	1109 STLAWR34	230 34	-0.07482	283.7	455.0	CONTINGENCY L33P
-537.9	328	BARR CH	118	1323 ARDOCH	118 1	-0.01121	60.8	87.5	CONTINGENCY X523A+W6MC?
-551.0	1303	SIDNEY	118	1355 LODGERM	118 1	0.01517	-51.2	87.5	CONTINGENCY B5QK
-712.1	1323	ARDOCH	118	1368 NORTHBRK	118 1	-0.01121	58.8	87.5	CONTINGENCY X523A+W6MC?
-733.7	328	BARR CH	118	1323 ARDOCH	118 1	-0.01131	58.4	87.5	CONTINGENCY BOTH_POLES
-880.3	INTERFACE MOSES-STLAW				0.10208	-503.0	781.0	CONTINGENCY ONE_POLE+T1	
-906.5	1323	ARDOCH	118	1368 NORTHBRK	118 1	-0.01131	56.4	87.5	CONTINGENCY BOTH_POLES
-961.8	1355	LODGERM	118	1368 NORTHBRK	118 1	0.01121	-56.0	87.5	CONTINGENCY X523A+W6MC?
-988.2	INTERFACE MOSES-STLAW				0.09635	-508.2	781.0	CONTINGENCY ONE_POLE	
-1116.5	328	BARR CH	118	1323 ARDOCH	118 1	-0.01222	51.3	87.5	CONTINGENCY ONE_POLE+T1
-1143.9	328	BARR CH	118	1323 ARDOCH	118 1	-0.01577	40.4	87.5	CONTINGENCY M32S
-1154.0	1355	LODGERM	118	1368 NORTHBRK	118 1	0.01131	-53.6	87.5	CONTINGENCY BOTH_POLES
-1267.8	1323	ARDOCH	118	1368 NORTHBRK	118 1	-0.01577	38.5	87.5	CONTINGENCY M32S
-1276.4	1323	ARDOCH	118	1368 NORTHBRK	118 1	-0.01222	49.4	87.5	CONTINGENCY ONE_POLE+T1
-1299.9	1303	SIDNEY	118	1355 LODGERM	118 1	0.01121	-52.3	87.5	CONTINGENCY X523A+W6MC?
-1353.4	1107	ST LAWRE	220	1109 STLAWR34	230 34	-0.07482	215.9	455.0	CONTINGENCY L33P+4UGR
-1445.4	1355	LODGERM	118	1368 NORTHBRK	118 1	0.01577	-35.7	87.5	CONTINGENCY M32S
-1475.1	1355	LODGERM	118	1368 NORTHBRK	118 1	0.01528	-36.8	87.5	CONTINGENCY X522A+M29C?
-1489.2	1303	SIDNEY	118	1355 LODGERM	118 1	0.01131	-49.8	87.5	CONTINGENCY BOTH_POLES
-1576.3	1107	ST LAWRE	220	1109 STLAWR34	230 34	-0.05428	269.4	455.0	CONTINGENCY ONE_POLE+T1
-1686.0	1303	SIDNEY	118	1355 LODGERM	118 1	0.01577	-31.9	87.5	CONTINGENCY M32S
-1723.3	1303	SIDNEY	118	1355 LODGERM	118 1	0.01528	-33.0	87.5	CONTINGENCY X522A+M29C?
-1765.8	INTERFACE MOSES-STLAW				0.11379	-370.4	781.0	CONTINGENCY X526B+X527B?	
-2706.8	104	MERIVALE	220	122 ALMONTE	220 1	-0.05077	65.0	296.0	CONTINGENCY BOTH_POLES
-2839.2	104	MERIVALE	220	122 ALMONTE	220 1	-0.06579	-12.1	296.0	CONTINGENCY X522A+T3?
-2839.8	104	MERIVALE	220	122 ALMONTE	220 1	-0.06579	-12.0	296.0	CONTINGENCY X523A+T2?
-2848.3	104	MERIVALE	220	122 ALMONTE	220 1	-0.06560	-11.7	296.0	CONTINGENCY X523A+T2?

LIGHTLOADIMPORT NONE----- 4LB7N3LK3D4B4P3LX lightloadimportexport.txt
TOTALS FOR INTERFACE MOSES-STLAW 1.00000 347.2

Table with columns: TRANS, CAPAB, FROM, TO, CKT, DISTR, FACTOR, MW, PRE-SHIFT, RATING, BAS/CNT, A/B, CONTINGENCY, DESCR. Rows include limiting elements like ST LAWRE, MISSIS J, and FITZRY J with associated ratings and contingencies.

LIGHTLOADIMPORT NONE----- 4LB7N3LK3D4B4P3LX lightloadimportexport.txt
TOTALS FOR INTERFACE FIOCLOSD 1.00000 -660.4

Table with columns: TRANS, CAPAB, FROM, TO, CKT, DISTR, FACTOR, MW, PRE-SHIFT, RATING, BAS/CNT, A/B, CONTINGENCY, DESCR. Rows include limiting elements like ST LAWRE, MISSIS J, and FITZRY J with associated ratings and contingencies.

LIGHTLOADIMPORT NONE----- 4LB7N3LK3D4B4P3LX lightloadimportimport.txt
 TOTALS FOR INTERFACE MOSES-STLW 1.00000 347.2

TOTAL TRANS CAPAB	FROM	LIMITING ELEMENT	TO	DISTR.	PRE-SHIFT	RATING BAS/CNT	CONTINGENCY DESCR
421.3	328 BARR CH	118 1323 ARDOCH	118 1	-0.15740	99.2	87.5	CONTINGENCY B5QK
397.8	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.15740	95.5	87.5	CONTINGENCY B5QK
390.2	328 BARR CH	118 1323 ARDOCH	118 1	-0.11636	92.5	87.5	CONTINGENCY X523A+W6MC?
372.3	1355 LODGERM	118 1368 NORTHBRK	118 1	0.15740	-91.5	87.5	CONTINGENCY B5QK
358.5	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.11636	88.8	87.5	CONTINGENCY X523A+W6MC?
339.3	1303 SIDNEY	118 1355 LODGERM	118 1	0.15740	-86.3	87.5	CONTINGENCY B5QK
324.0	1355 LODGERM	118 1368 NORTHBRK	118 1	0.11636	-84.8	87.5	CONTINGENCY X523A+W6MC?
321.6	328 BARR CH	118 1323 ARDOCH	118 1	-0.15852	83.4	87.5	CONTINGENCY X522A+M29C?
320.1	328 BARR CH	118 1323 ARDOCH	118 1	-0.16361	83.1	87.5	CONTINGENCY M32S
309.5	* 328 BARR CH	118 1323 ARDOCH	118 1	-0.15379	81.7	87.5	CONTINGENCY X523A+T2?
298.2	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.15852	79.7	87.5	CONTINGENCY X522A+M29C?
297.5	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.16361	79.4	87.5	CONTINGENCY M32S
285.4	* 1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.15379	78.0	87.5	CONTINGENCY X523A+T2?
279.3	1303 SIDNEY	118 1355 LODGERM	118 1	0.11636	-79.6	87.5	CONTINGENCY X523A+W6MC?
272.9	1355 LODGERM	118 1368 NORTHBRK	118 1	0.16360	-75.4	87.5	CONTINGENCY M32S
272.9	1355 LODGERM	118 1368 NORTHBRK	118 1	0.15853	-75.7	87.5	CONTINGENCY X522A+M29C?
260.7	* 1355 LODGERM	118 1368 NORTHBRK	118 1	0.16361	-73.4	87.5	CONTINGENCY C3S
241.1	1303 SIDNEY	118 1355 LODGERM	118 1	0.16361	-70.2	87.5	CONTINGENCY M32S
240.1	1303 SIDNEY	118 1355 LODGERM	118 1	0.15852	-70.5	87.5	CONTINGENCY X522A+M29C?
230.8	130 EAS YU21	220 1107 ST LAWRE	220 1	0.35046	-356.2	397.0	CONTINGENCY L20H+L22H?
228.9	* 1303 SIDNEY	118 1355 LODGERM	118 1	0.16361	-68.2	87.5	CONTINGENCY C3S
181.9	104 MERIVALE	220 122 ALMONTE	220 1	-0.68073	183.5	296.0	CONTINGENCY X523A+T2?
181.0	1 HAWTHORN	500 103 HAWTHORN	220 T3	2.44241	-384.3	790.0	BASE CASE
180.8	104 MERIVALE	220 122 ALMONTE	220 1	-0.68275	182.4	296.0	CONTINGENCY X522A+T3?
180.7	104 MERIVALE	220 122 ALMONTE	220 1	-0.68266	182.4	296.0	CONTINGENCY X523A+T2?
180.3	1 HAWTHORN	500 103 HAWTHORN	220 T2	2.43619	-383.4	790.0	BASE CASE
178.7	132 EASTN20	220 1107 ST LAWRE	220 1	0.35026	-338.0	397.0	CONTINGENCY L21H+L22H?
167.3	104 MERIVALE	220 122 ALMONTE	220 1	-0.65122	178.9	296.0	CONTINGENCY X522A
167.3	* 104 MERIVALE	220 122 ALMONTE	220 1	-0.65122	178.9	296.0	CONTINGENCY X523A
165.2	122 ALMONTE	220 2242 WILSJ29	220 1	-0.68073	172.1	296.0	CONTINGENCY X523A+T2?
164.8	132 EASTN20	220 1132 CROSBJ20	220 1	-0.35025	333.1	397.0	CONTINGENCY L21H+L22H?
164.1	122 ALMONTE	220 2242 WILSJ29	220 1	-0.68276	171.0	296.0	CONTINGENCY X522A+T3?
164.0	122 ALMONTE	220 2242 WILSJ29	220 1	-0.68266	171.0	296.0	CONTINGENCY X523A+T2?
149.8	122 ALMONTE	220 2242 WILSJ29	220 1	-0.65122	167.5	296.0	CONTINGENCY X523A
149.8	* 122 ALMONTE	220 2242 WILSJ29	220 1	-0.65122	167.5	296.0	CONTINGENCY X522A
96.0	1105 HINCHBRK	220 1132 CROSBJ20	220 1	0.35026	-309.0	397.0	CONTINGENCY L21H+L22H?
91.2	100 CHAT FLS	220 1161 MARINJ28	220 1	-0.52734	159.0	294.0	CONTINGENCY X522A+M29C?
87.9	103 HAWTHORN	220 121 ALBION31	220 1	-1.91196	409.3	905.0	CONTINGENCY X523A+M30A?
87.9	103 HAWTHORN	220 120 ALBION30	220 1	-1.91197	409.3	905.0	CONTINGENCY X522A+M31A?
86.9	100 CHAT FLS	220 1149 HAVELK26	220 1	-0.53003	156.1	294.0	CONTINGENCY X522A+M29C?
83.9	1 HAWTHORN	500 103 HAWTHORN	220 T3	3.50765	-544.5	1468.0	CONTINGENCY HAW-T2

LIGHTLOADIMPORT NONE----- 4LB7N3LK3D4B4P3LX lightloadimportimport.txt
 TOTALS FOR INTERFACE FIOCLOSED 1.00000 -660.4

TOTAL TRANS CAPAB	FROM	LIMITING ELEMENT	TO	DISTR.	PRE-SHIFT	RATING BAS/CNT	CONTINGENCY DESCR
109.4	328 BARR CH	118 1323 ARDOCH	118 1	-0.01517	99.2	87.5	CONTINGENCY B5QK
-134.5	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01517	95.5	87.5	CONTINGENCY B5QK
-213.2	328 BARR CH	118 1323 ARDOCH	118 1	-0.01121	92.5	87.5	CONTINGENCY X523A+W6MC?
-398.9	1355 LODGERM	118 1368 NORTHBRK	118 1	0.01517	-91.5	87.5	CONTINGENCY B5QK
-543.1	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01121	88.8	87.5	CONTINGENCY X523A+W6MC?
-742.1	1303 SIDNEY	118 1355 LODGERM	118 1	0.01517	-86.3	87.5	CONTINGENCY B5QK
-900.7	1355 LODGERM	118 1368 NORTHBRK	118 1	0.01121	-84.8	87.5	CONTINGENCY X523A+W6MC?
-926.1	328 BARR CH	118 1323 ARDOCH	118 1	-0.01528	83.4	87.5	CONTINGENCY X522A+M29C?
-941.4	328 BARR CH	118 1323 ARDOCH	118 1	-0.01577	83.1	87.5	CONTINGENCY M32S
-1051.3	* 328 BARR CH	118 1323 ARDOCH	118 1	-0.01482	81.7	87.5	CONTINGENCY X523A+T2?
-1168.2	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01528	79.7	87.5	CONTINGENCY X522A+M29C?
-1176.0	1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01577	79.4	87.5	CONTINGENCY M32S
-1300.9	* 1323 ARDOCH	118 1368 NORTHBRK	118 1	-0.01482	78.0	87.5	CONTINGENCY X523A+T2?
-1365.0	1303 SIDNEY	118 1355 LODGERM	118 1	0.01121	-79.6	87.5	CONTINGENCY X523A+W6MC?
-1430.4	1355 LODGERM	118 1368 NORTHBRK	118 1	0.01577	-75.4	87.5	CONTINGENCY M32S
-1430.8	1355 LODGERM	118 1368 NORTHBRK	118 1	0.01528	-75.7	87.5	CONTINGENCY X522A+M29C?
-1557.2	* 1355 LODGERM	118 1368 NORTHBRK	118 1	0.01577	-73.4	87.5	CONTINGENCY C3S
-1760.6	1303 SIDNEY	118 1355 LODGERM	118 1	0.01577	-70.2	87.5	CONTINGENCY M32S
-1771.6	1303 SIDNEY	118 1355 LODGERM	118 1	-0.01528	-70.5	87.5	CONTINGENCY X522A+M29C?
-1867.3	130 EAS YU21	220 1107 ST LAWRE	220 1	0.03377	-356.2	397.0	CONTINGENCY L20H+L22H?
-1887.4	* 1303 SIDNEY	118 1355 LODGERM	118 1	0.01577	-68.2	87.5	CONTINGENCY C3S
-2375.1	104 MERIVALE	220 122 ALMONTE	220 1	-0.06560	183.5	296.0	CONTINGENCY X523A+T2?
-2384.2	1 HAWTHORN	500 103 HAWTHORN	220 T3	0.23536	-384.3	790.0	BASE CASE
-2386.9	104 MERIVALE	220 122 ALMONTE	220 1	-0.06579	182.4	296.0	CONTINGENCY X522A+T3?
-2387.4	104 MERIVALE	220 122 ALMONTE	220 1	-0.06578	182.4	296.0	CONTINGENCY X523A+T2?
-2392.4	1 HAWTHORN	500 103 HAWTHORN	220 T2	0.23476	-383.4	790.0	BASE CASE
-2408.8	132 EASTN20	220 1107 ST LAWRE	220 1	0.03375	-338.0	397.0	CONTINGENCY L21H+L22H?
-2526.7	104 MERIVALE	220 122 ALMONTE	220 1	-0.06275	178.9	296.0	CONTINGENCY X522A
-2526.7	* 104 MERIVALE	220 122 ALMONTE	220 1	-0.06275	178.9	296.0	CONTINGENCY X523A
-2548.7	122 ALMONTE	220 2242 WILSJ29	220 1	-0.06560	172.1	296.0	CONTINGENCY X523A+T2?
-2552.2	132 EASTN20	220 1132 CROSBJ20	220 1	-0.03375	333.1	397.0	CONTINGENCY L21H+L22H?
-2559.9	122 ALMONTE	220 2242 WILSJ29	220 1	-0.06579	171.0	296.0	CONTINGENCY X522A+T3?
-2560.5	122 ALMONTE	220 2242 WILSJ29	220 1	-0.06578	171.0	296.0	CONTINGENCY X523A+T2?
-2708.1	122 ALMONTE	220 2242 WILSJ29	220 1	-0.06275	167.5	296.0	CONTINGENCY X523A
-2708.1	* 122 ALMONTE	220 2242 WILSJ29	220 1	-0.06275	167.5	296.0	CONTINGENCY X522A

2.8 Summary of Stability Results

2.8.1 Conventions

The following conventions have been applied to label results.

Exports = 1250 MW transfer from Ontario to Quebec

Import = 1250 MW transfer from Quebec to Ontario

Heavy = 1700 MW of Ottawa load

Light = 600 MW of Ottawa load

The Ottawa area is bounded by circuits X522A, X523A, C3S, M29C, L24A, B5D,C7BM and W6M

2.8.2 Summaries of Test Conditions

Scenario	Drawing	Text Summary	Simulation Results
Export-Heavy	page 29	page 2	included – angle stable and damped
Export-Light	page 30	page 3	included – angle stable and damped
Import-Heavy	page 31	page 4	included – angle stable and damped
Import-Light	page 32	page 5	included – angle stable and damped
Notransfer-Heavy	page 33	page 6	no simulations, included for completeness
Notransfer- Light	page 34	page 7	no simulations, included for completeness

2.8.3 Transient Stability Simulations

Responses to the tested contingencies are shown on the following plots. The response was acceptable in all cases.

	Transient Simulations Results (plot #)			
	Export-heavy	Export-Light	Import-Heavy	Import-Light
Loss of bipole	s,d (#1)	s,d (#5)	s,d (#9)	s,d (#13)
LLG L24a+D5A	s,d (#2)	s,d (#6)	s,d (#10)	s,d (#14)
LLG X523A+M31A	s,d (#3)	s,d (#7)	s,d (#11)	s,d (#15)
STK X522a+T1	s,d (#4)	s,d (#8)	s,d (#12)	s,d (#16)

s=stable d=damped – both are required LLG line-line-ground fault STK stuck breaker

Description of Output Channels

Plot Marker	Rotor Angle a	Eastern Voltages b	HVDC Quantities c	Active Power Flow d
Square	Trans Alta OHSC	Hawthorne 500 kV	Ottawaais 315 kV	L33P
Triangle	Chats Falls	Lennox 500 kV	Ottawaais 220 kV	X523A
Diamond	Saunders	Hawthorne 220 kV	HQ1 MW flow	M30A
Plus	Chenau	Merivale 220 kV	HQ1 MX flow	L24A
X	Lennox	Chat Falls 220 kV	HQ2 MW flow	D5A
Y	Darlington	St. Lawrence 220 kV	HQ2 MX flow	M29C

Multiple Channel Comparisons

17a	17c
17b	17d

18a	18c
18b	18d

Plot(s)	Behaviour highlighted by the plot
17a	Export light load produces greatest rotor swings
17b	L33P response is symmetric for import or exports over the HVDC
17c	All faults have a similar response but ΔV at Hawthorne greatest for bipole loss
17d	HQ1 response is symmetric for import/export conditions and similar for all non-bipole loss faults
18a,b	Non-bipole faults produce less damping at light load and higher rotor angle swings for export
18c,d	Bipole faults produce less damping at light load and higher rotor angle swings for export

2.9 Relay Margin Analysis

The follow criteria was used to alarm for possible distance relay encroachments

	Centre	Angle
A	$0.46 * Z_{line}$	$\arctan(x_{line}/r_{line})$
B	$0.92 * Z_{line}$	$\arctan(x_{line}/r_{line})$
C	$1.10 * Z_{line}$	$\arctan(x_{line}/r_{line})$

No “B” alarms were reported after fault clearing. With the Hydro One practice of having 125% of apparent line impedance reach for zone 2, no relay margins violations will occur.

2.10 Fault Clearing Model and Timing

Normal Clearing

Local: Pr Relay + Trip Aux + BTM + HV Breaker = 25+4+4+(33 2~,50 3~) = 66 (2~),83 (3~)

Remote: Pr Relay + Comm + Trip Aux + BTM + HV Breaker = 91 (2~)108 (3~)

Delayed Clearing

Local Add 62b timer + Another Trip Aux = 66 + 90 + 4 = 160 msec (2 ~)

83 + 105 + 4 = 175 msec (3 ~)

Pr Primary Relaying, Comm communication time, BTM = Breaker Trip Module

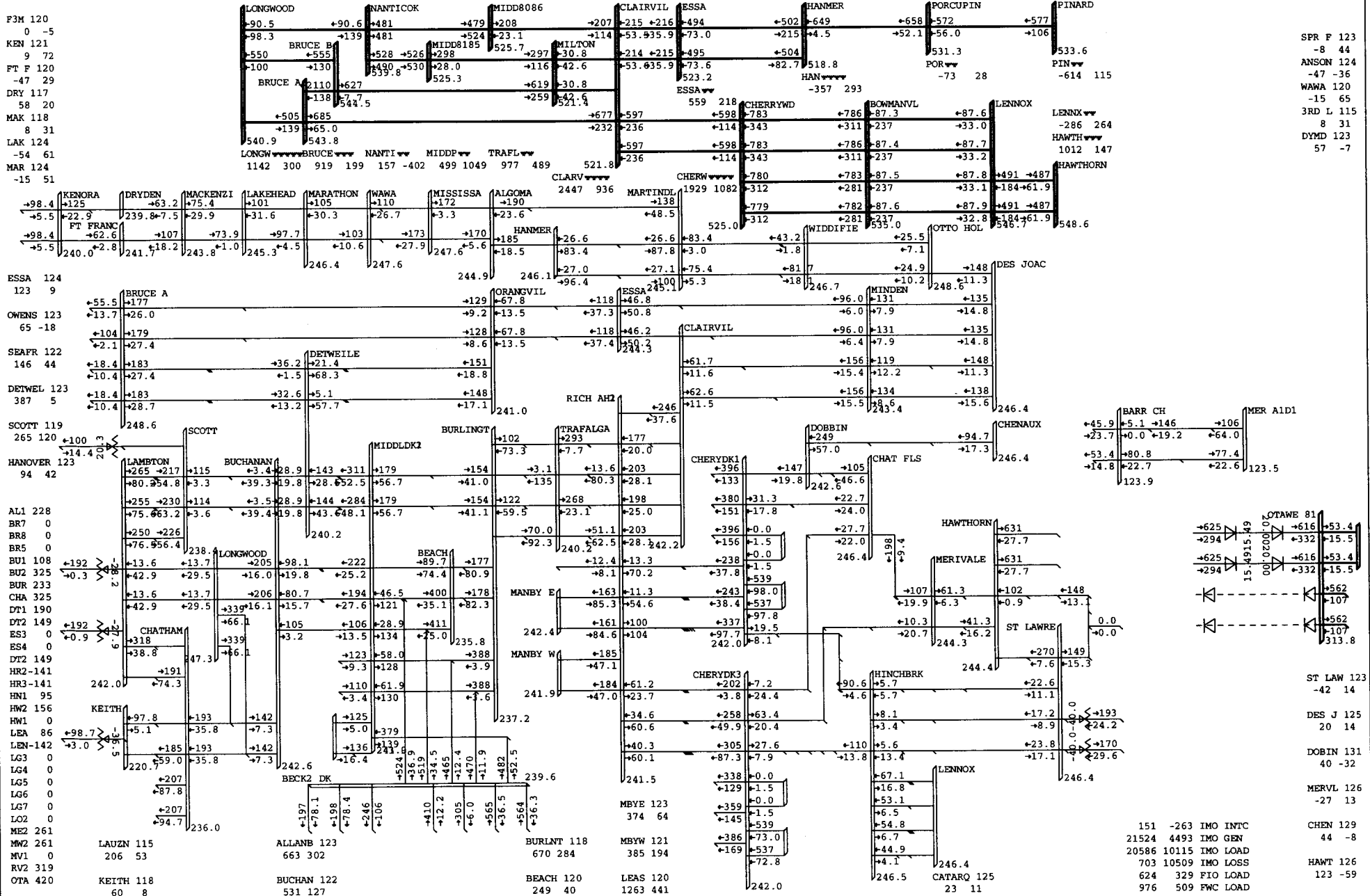
2.11 Conservative Assumptions Made during Contingency Simulations

1. All faults assumed to block HVDC
2. All llg treated as solid three phase faults
3. Timing for HQ1+HQ2 fault provided by H1 is 70 ms for faults at Hawthorne and about 90 ms for faults at Outaouais. A clearing time just short of the standard has been used.

Contingency	Fault Z and loc	Block DC	Local Trip	Remote Trip	Unblock DC
LLG L24A + D5A	solid Haw 220	0	+83	+108	+158
LLG X523A+M31A	solid Haw 5&2	0	+66,+83	+91,+108	+158
STK X522A + T1	solid Haw 5	0	+160	+91	+210
LLG HQ1+HQ2	solid Haw 220	0	+106		

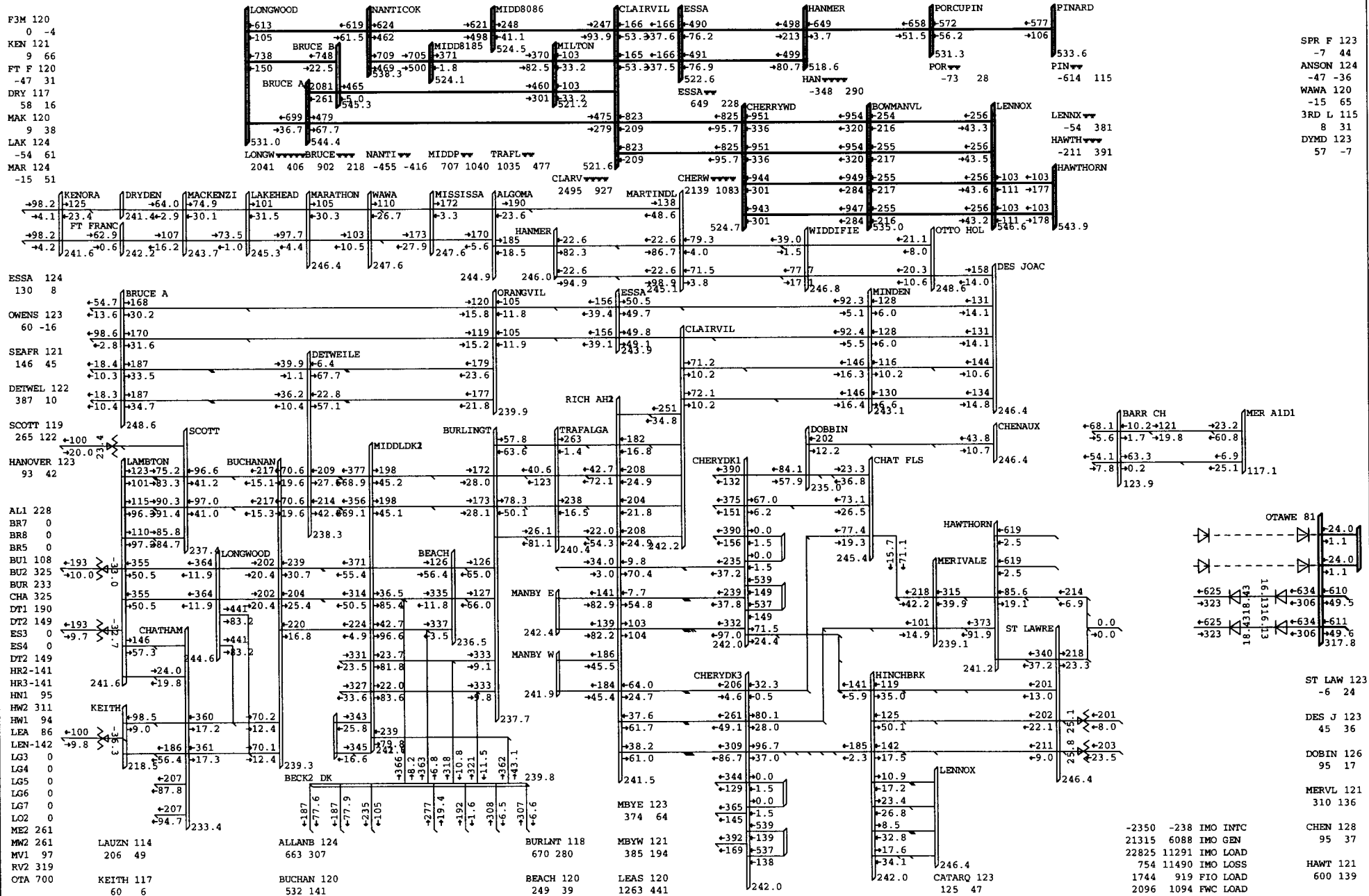
LIGHTLOADEXPORT 1250_TO_HQ1+2----- 4LB8N3LK3D4B4P3LX
 ->HQ1262FIO1583FIO-C1850TEC-3136STL368X522+3982L24A266

BR 3300 406, LB 1850 549, NA 1780 1108, B2 1263 647, LV 763 159, PK 2160 691, DR 2790 640, LX 1575 -186, SD 848 73



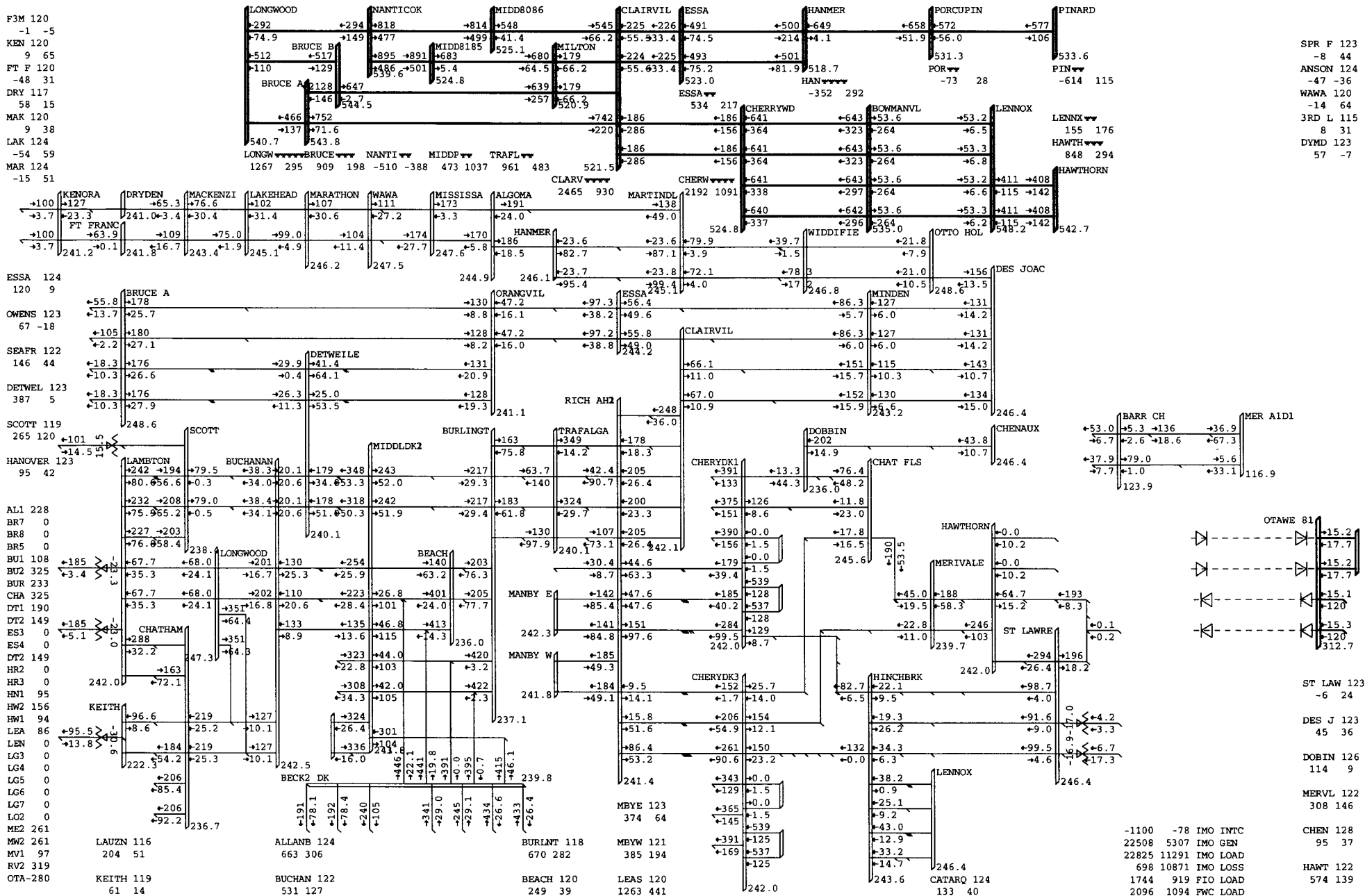
HEAVYLOADIMPORT 1250_FROM_HQ1+2--- 4LB7N3LK3D4B4P3LX
 ->HQ-1238FIO257FIO-C470TEC-3589STL-400X522+3-206L24A335

BR 3300 643, LB 400 640, NA 3500 1466, B2 1263 427, LV 854 159, PK 2160 938, DR 2790 749, LX 1005 65, SD 848 285



HEAVYLOADNOTTRANSFER 0_WITH_HQ1+2-- 4LB7N3LK3D4B4P3LX
 ->HQOFIO1471FIO-C1714TEC-1993STL-8X522+3822L24A290

BR 3300 419, LB 1600 532, NA 3500 1394, B2 1263 494, LV 847 177, PK 2160 864, DR 2790 584, LX 1005 -28, SD 848 187



LIGHTLOADNOTTRANSFER 0_WITH_HQ1+2-- 4LB7N3LK3D4B4P3LX
 ->HQ0FIO341FIO-C576TEC-4183STL-3X522+3-70L24A291

BR 3300 429, LB 1600 530, NA 1280 978, B2 1263 465, LV 800 143, PK 2160 771, DR 2790 693, LX 1005 -186, SD 848 62

