

1 Q. Further to the response to PUB-NLH-003, provide details on the amount of the
2 capacity shortfall and the number of customers affected by the two events listed in
3 the response and the recent period of rotating outages from January 2-8, 2014.

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6 A. The following sections outline the system supply impacts and what is known at this
7 time regarding the customer impact resulting from the two events listed in the
8 response to PUB-NLH-003 and the recent period of rotating outages from January
9 2-8, 2014. It is difficult to determine the capacity shortfall for each event due to the
10 dynamics of the power system, the range of accuracy in short-term load forecasting
11 and the effect that conservation and customer curtailment may have had on any
12 potential shortfall. However, to help the reader gain a better understanding of the
13 available reserves during each of the events, supply and demand charts are
14 provided in PUB-NLH-052, Attachment 1 for each of the days.

15

16 **Generation Supply Issues - January 23, 2006**

17 The events on January 23, 2006 were related to generation supply issues. There
18 was 307 MW of generation capacity unavailable to the system with details as per
19 the following table.

Island Interconnected System Supply Issues and Power Outages

Table 1

Generation Supply Issues - January 23, 2006			
Plant	Unit Rating (MW)	Unavailable Capacity (MW)	Notes
Holyrood Unit 2	170	170	Boiler tube failure (January 6, 2006)
Upper Salmon Unit	84	84	Frazil Ice blockage at intake
Hardwoods Gas Turbine ¹	54	24	Derated due to control system failures
Stephenville Gas Turbine ¹	54	27	Derated due to fuel nozzle failure on one End
Holyrood Gas Turbine	10	2	Derated due to oil leak and fire (unit ran with fire watch)
Total	372	307	

1 Notes: 1. The rating of these units subsequent to 2006 were adjusted to 50MW.

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3 There were three Island Industrial Customers impacted on this day, as per the
4 following:

Table 2

Generation Supply Issues - January 23, 2006		
Customer Impacted	Load Curtailment (MW)	Duration
Corner Brook Pulp and Paper Limited	20	one hour
Abitibi Consolidated - Grand Falls	20	one hour
North Atlantic Refining Limited	4	seven hours
Total	44	

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7 **System Events - January 11, 2013**

8 There were a series of events on January 11, each with differing severity in terms of
9 system generation supply and customer impacts. Please refer to Hydro's response
10 to PUB-NLH-045 for additional detail.

11

12 As a result of the TL-201 transmission line trip at 0742 hours, there was a significant
13 overfrequency experienced on the system and the loss of multiple generating plants

Island Interconnected System Supply Issues and Power Outages

1 and transmission lines. The units at Holyrood were already out of service due to
 2 the Holyrood switchyard electrical faults that had occurred earlier in the morning.
 3 The following table summarizes the total amount of unavailable system generating
 4 capacity following the TL-201 trip.

Table 3

Generation Supply Issues - January 11, 2013 (as at 0743 hours)			
Plant	Unit Rating (MW)	Unavailable Capacity (MW)	Notes
Stephenville Gas Turbine	50	50	Unit unavailable due to work to rewind alternator
Holyrood Units 1-3	490	490	Units had tripped previously in the morning
Star Lake	18	18	Unit had tripped previously in the morning
Cat Arm Units 1 and 2	127	127	Units tripped due to high system frequency
Upper Salmon Unit	84	84	Unit tripped due to high system frequency
Granite Canal Unit	40	40	Unit tripped due to high system frequency
Other Purchases	83	21	NUGS reduction due to system upset
Total	892	830	

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7 Hydro does not have the detail regarding the specific number of customers
 8 impacted by the events on January 11, 2013. However, a table of supply point
 9 interruption data was prepared and is attached as PUB-NLH-052, Attachment 2.

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11 **Period of Feeder Interruptions – January 2-8, 2014**

12 In the period from January 2 to 8, 2014 there were five days during which feeder
 13 interruptions were reported¹. In addition, there was a significant system event
 14 initiated by the failure of transformer T1 at Sunnyside. Table 4 contains the detail
 15 regarding the unavailable capacity immediately prior to the onset of feeder
 16 interruptions on each day. Table 5 outlines the available capacity following the
 17 system event initiated at Sunnyside at 0905 hours on January 4.

¹ There were no feeder interruptions reported on January 4 and 7, 2014.

Island Interconnected System Supply Issues and Power Outages

Table 4

Rotating Outages - January 2-8, 2014						
Plant	Unit Rating (MW)	Jan-2 Unavailable Capacity (MW)	Jan-3 Unavailable Capacity (MW)	Jan-5 Unavailable Capacity (MW)	Jan-6 Unavailable Capacity ¹ (MW)	Jan-8 Unavailable Capacity ² (MW)
Hardwoods Gas Turbine	50	50	50	50	50	50
Stephenville Gas Turbine	50	20	20	20	20	25
Holyrood Unit 3	150	100	100	100	150	100
Holyrood Unit 2	170	5	5	5	170	5
Holyrood Unit 1	170	5	5	170	170	170
Granite Canal Unit	40	8	8	-	-	-
Exploits Generation	63	25	24	26	21	14
Total	693	213	212	371	581	364

Notes:

1. On January 6, HRD Unit 2 (165 MW) and HRD Unit 3 (50 MW) were brought on-line during the period of feeder interruptions. The additional generation, as it became re-established, helped to minimize the duration and impact.
2. On January 8, HRD Unit 1 (165 MW) was brought on-line during the period of feeder interruptions. The additional generation, as it became re-established, helped to minimize the duration and impact.

Table 5

Generation Supply Issues - January 4, 2014 (as at 0906 hours)			
Plant	Unit Rating (MW)	Unavailable Capacity (MW)	Notes
Hardwoods Gas Turbine	50	50	Unit unavailable due to fuel valve issue
Holyrood Units 1-3	490	490	Units tripped during the system disturbance ¹
Stephenville Gas Turbine	50	50	Unit tripped during system disturbance ²
St. Anthony and Hawkes Bay Diesels	15	15	Units tripped during system disturbance
Cat Arm Units 1 and 2	127	127	Units tripped during system disturbance
Upper Salmon Unit	84	84	Unit tripped during system disturbance
Hinds Lake Unit	75	75	Unit tripped during system disturbance
Granite Canal Unit	40	40	Unit tripped during system disturbance
Purchases	59	59	Units tripped during system disturbance
Total	990	990	

Notes:

1. Unit 3 derated to 50 MW prior to this event due to forced draft fan failure.
2. Unit previously derated to 30 MW prior to this event due to cooling issues.

Island Interconnected System Supply Issues and Power Outages

1 Hydro does not have the detail regarding the specific number of customers
 2 impacted during these events; however the following table outlines the feeder
 3 interruption impact as reported by NP and Hydro.

Table 6

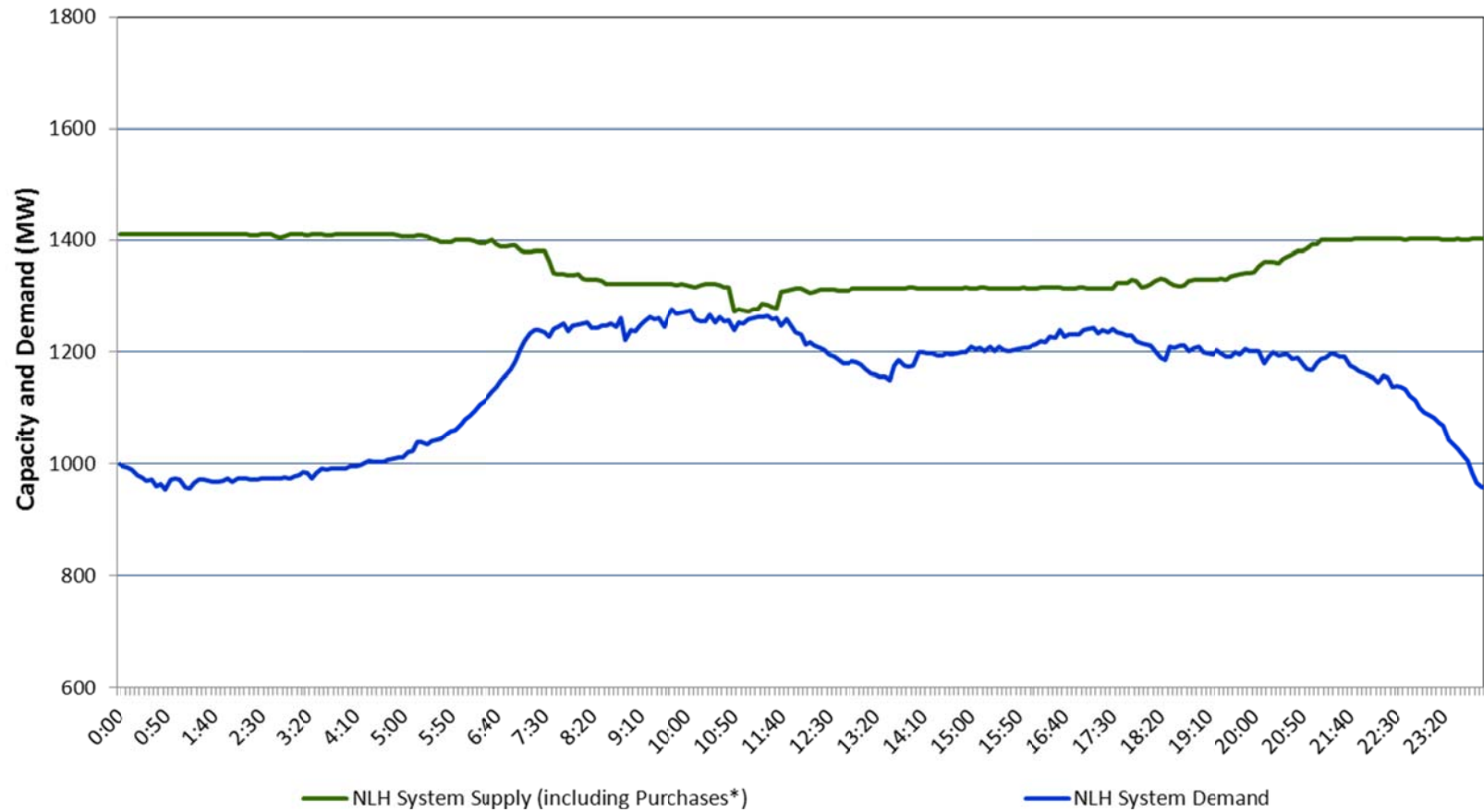
	Feeder Rotation Times		Newfoundland Power Average Feeder Duration Interruptions (mins)		Newfoundland Hydro Average Feeder Duration Interruptions (mins)	
	Start	End				
January 2, 2014	4:13 PM	10:46 PM	77	88	6	30
January 3, 2014	6:57 AM	7:36 PM	141	44	25	30
January 5, 2014	7:23 AM	8:29 PM	158	54	5	60
January 6, 2014	5:17 AM	10:48 AM	39	47	n/a	n/a
January 8, 2014	3:23 PM	5:42 PM	32	25	3	30

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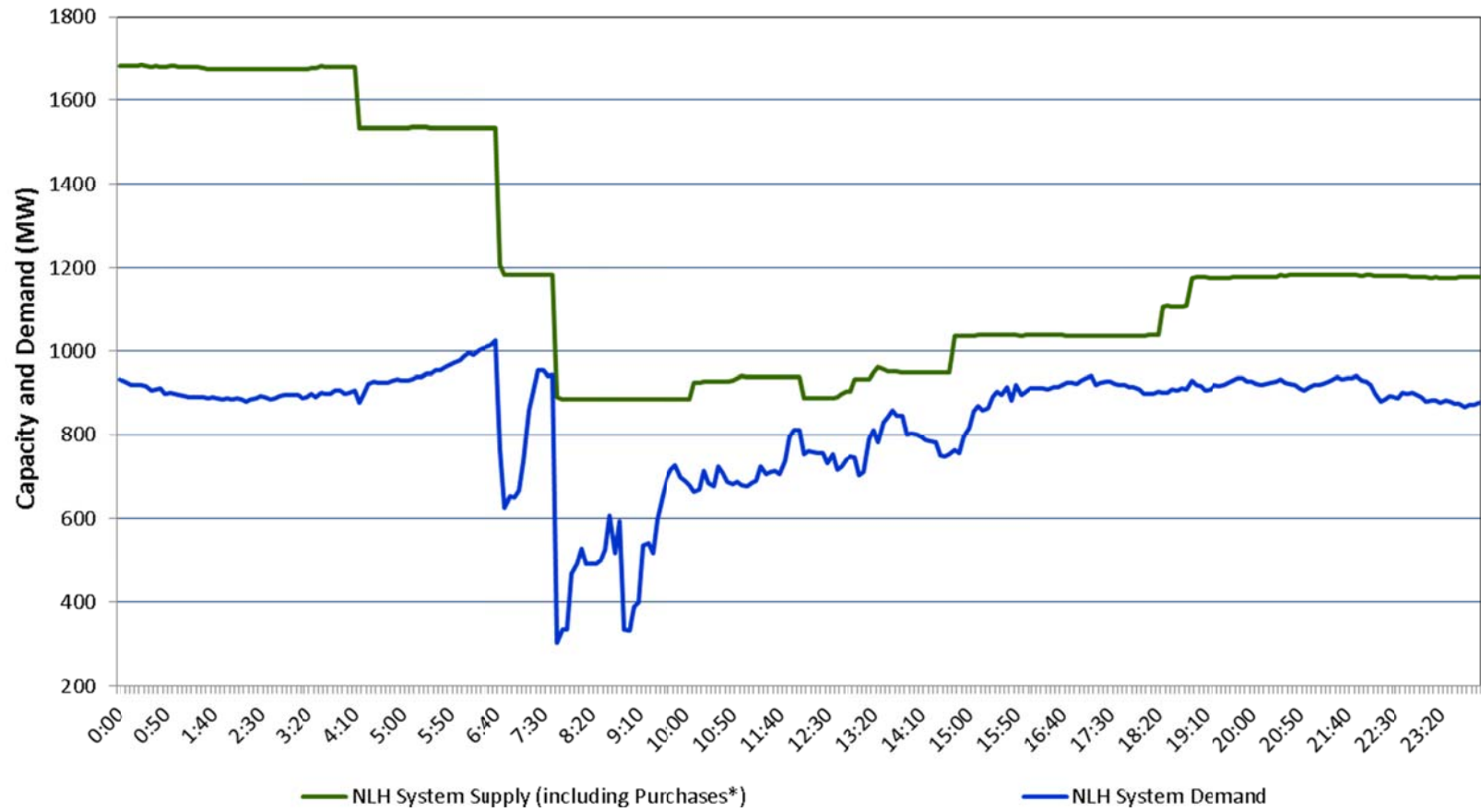
6 The feeder interruptions on January 6 were carried out on the Avalon Peninsula, as
 7 there were generation issues at Holyrood that limited the supply to the area.

Newfoundland and Labrador Hydro NLH System Supply and Demand January 23, 2006



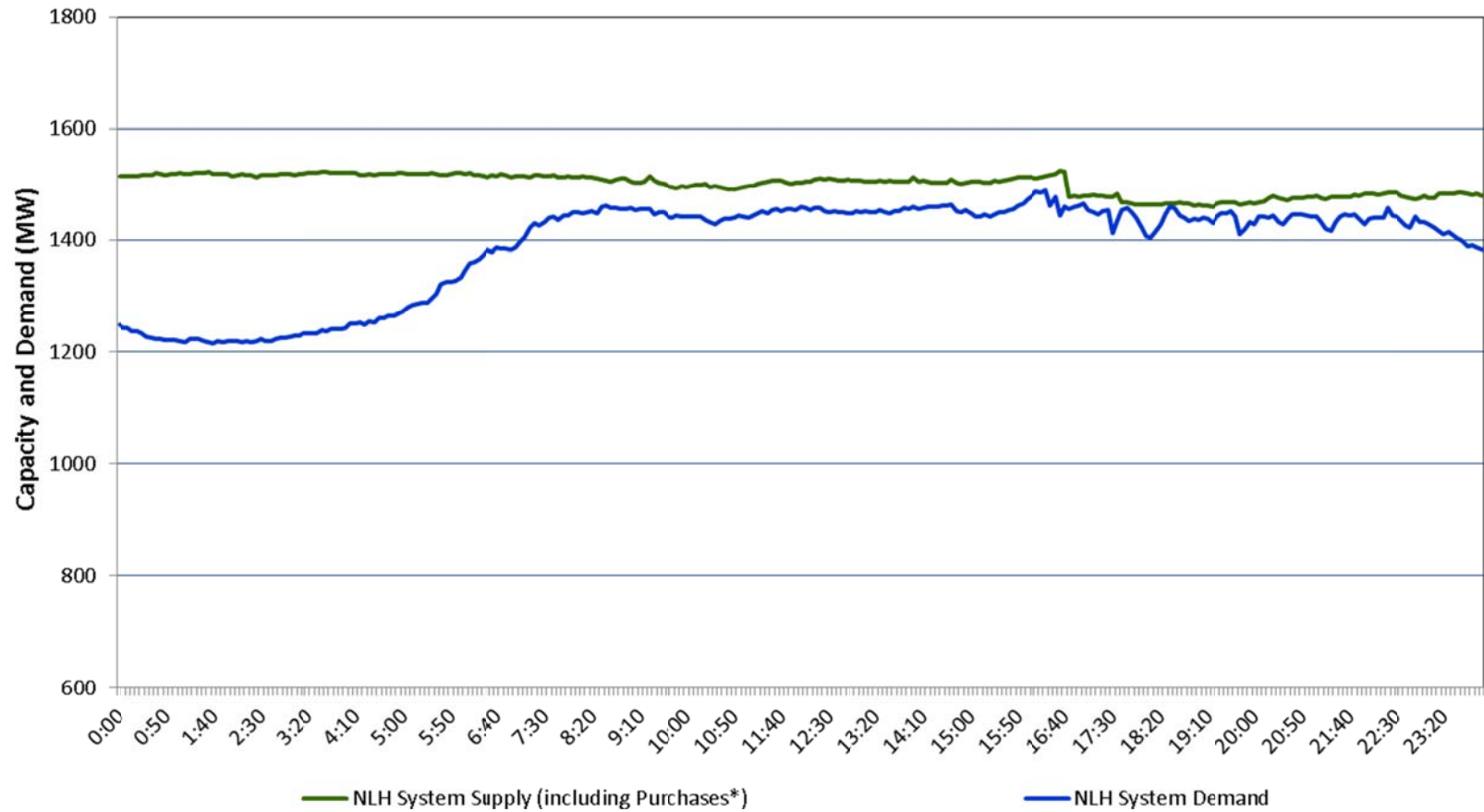
* Purchases include Star Lake, Rattle Brook, and CBPP Co-Gen

Newfoundland and Labrador Hydro NLH System Supply and Demand January 11, 2013



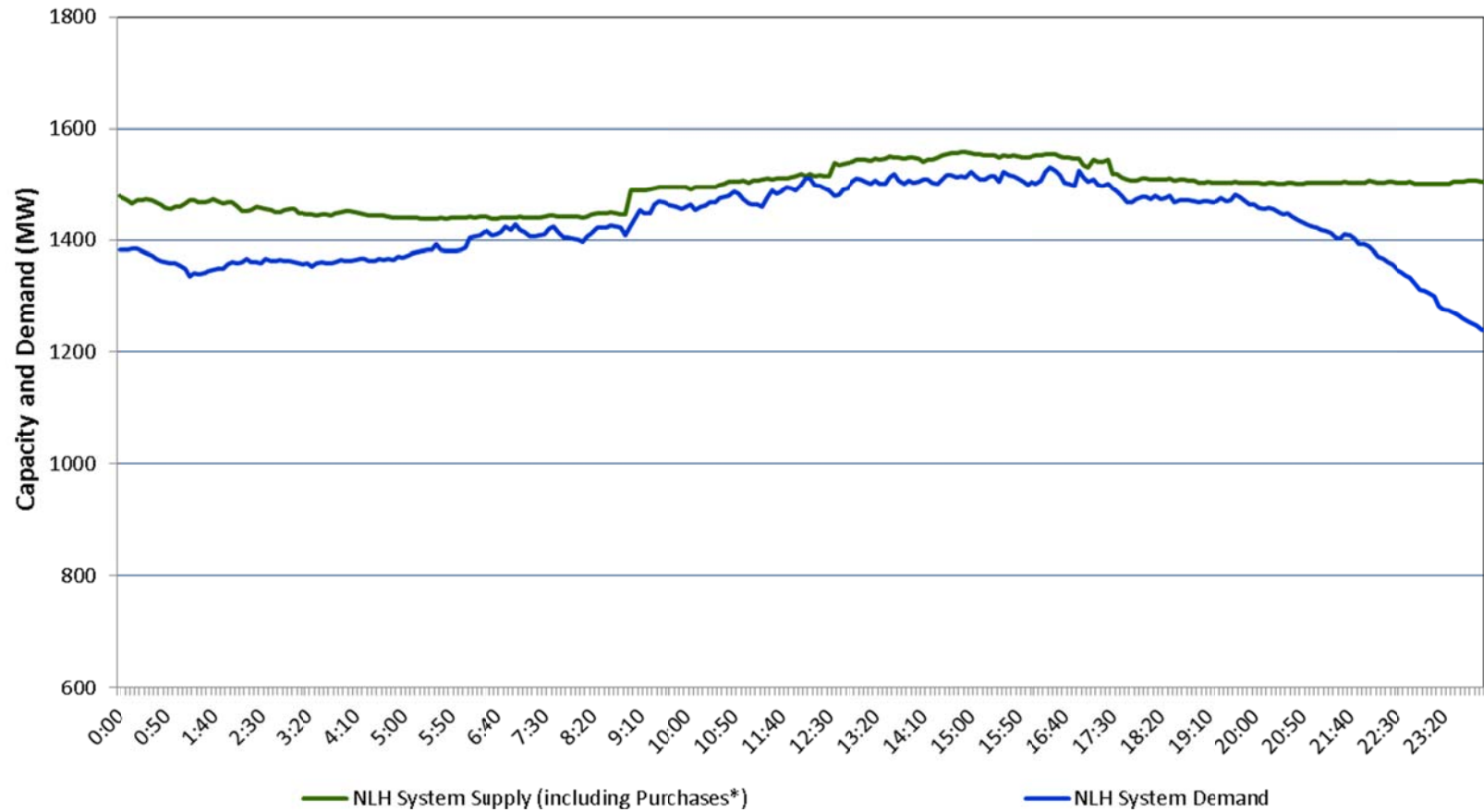
* Purchases include Nalcor Exploits and Star Lake, Rattle Brook, CBPP Co-Gen and Wind Generation

Newfoundland and Labrador Hydro NLH System Supply and Demand January 2, 2014



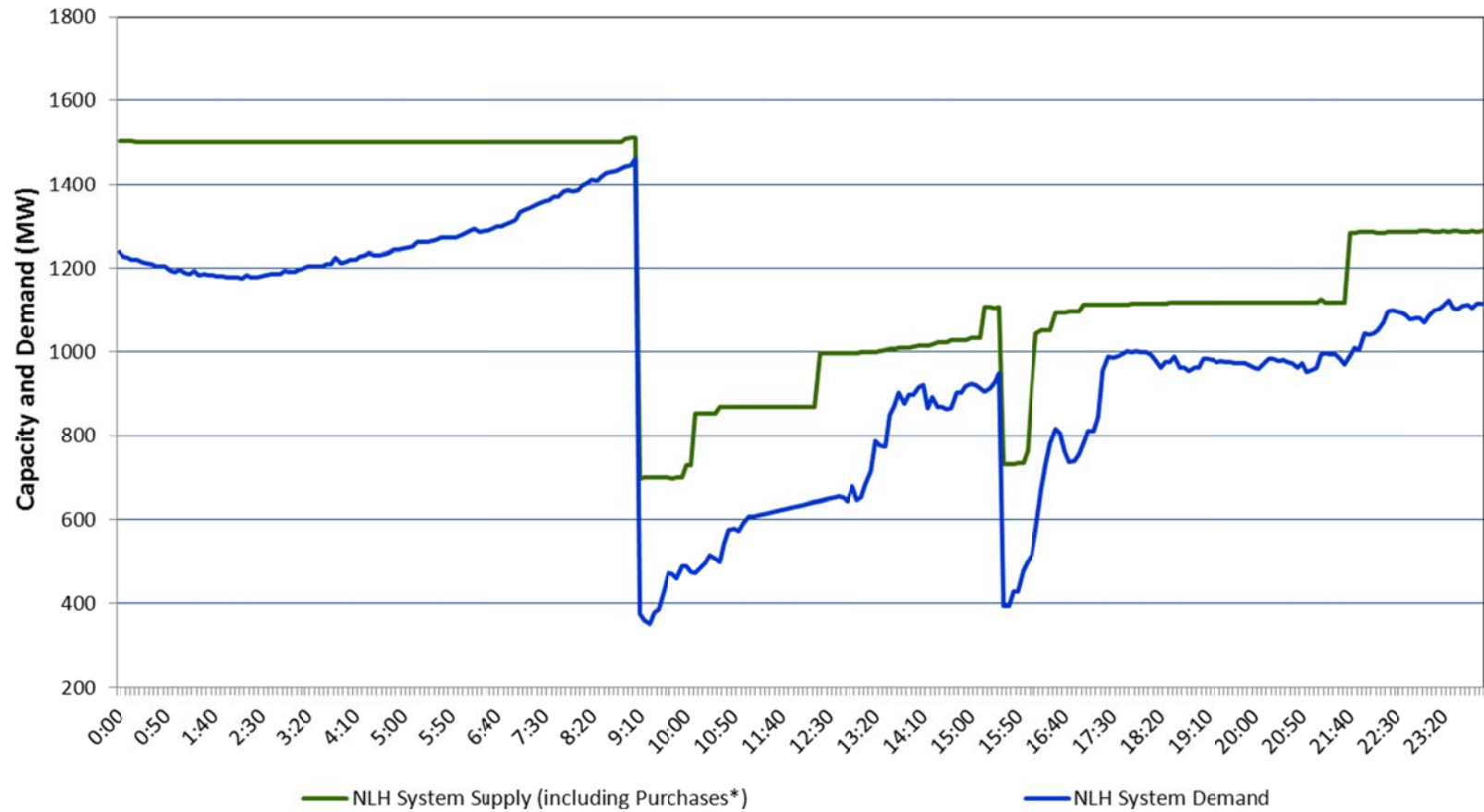
* Purchases include Nalcor Exploits and Star Lake, Rattle Brook, CBPP Co-Gen, Wind Generation, and CBPP Curtailable Load (60 MW)

Newfoundland and Labrador Hydro NLH System Supply and Demand January 3, 2014



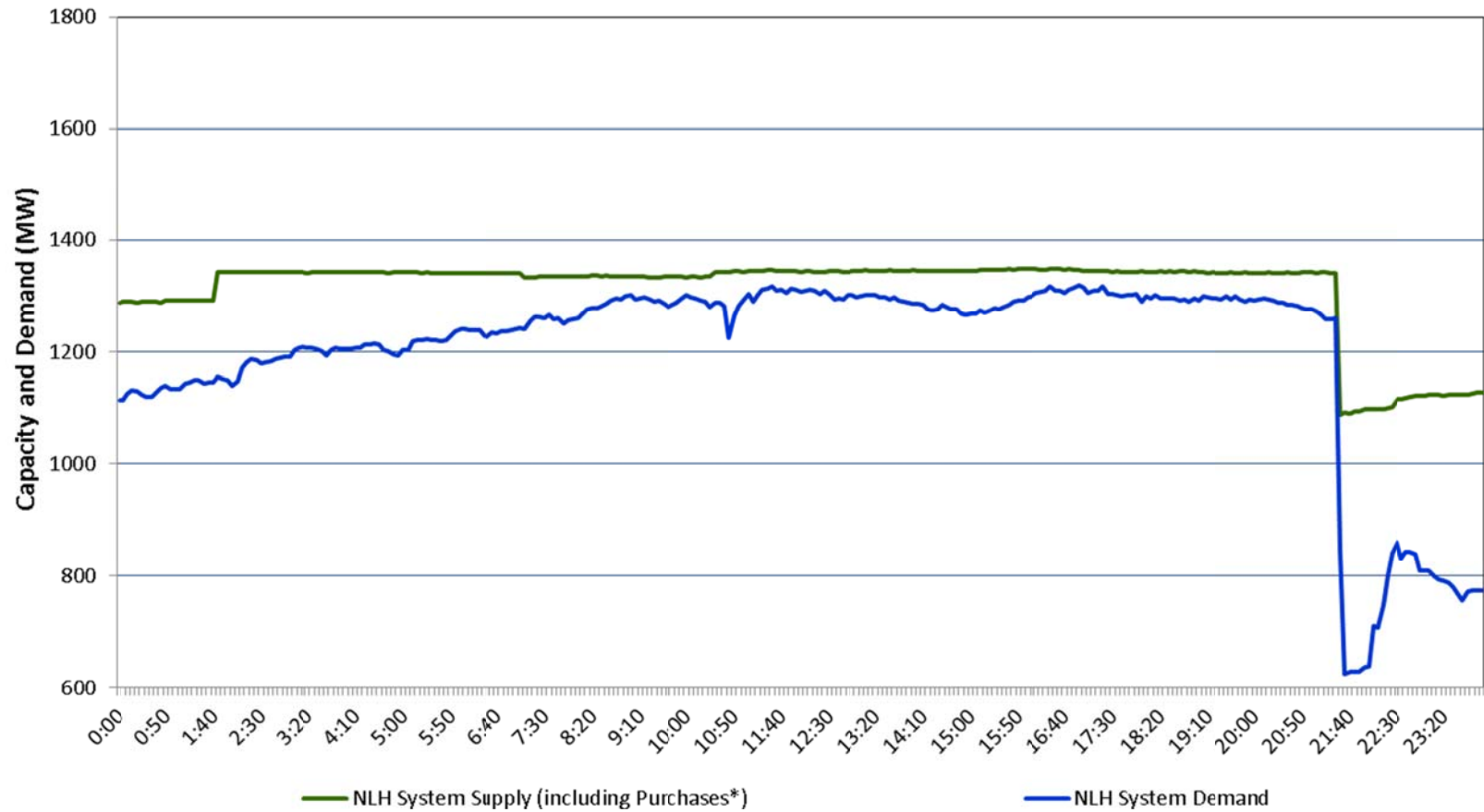
* Purchases include Nalcor Exploits and Star Lake, Rattle Brook, CBPP Co-Gen, Wind Generation, and CBPP Curtailable Load (60 MW)

Newfoundland and Labrador Hydro NLH System Supply and Demand January 4, 2014



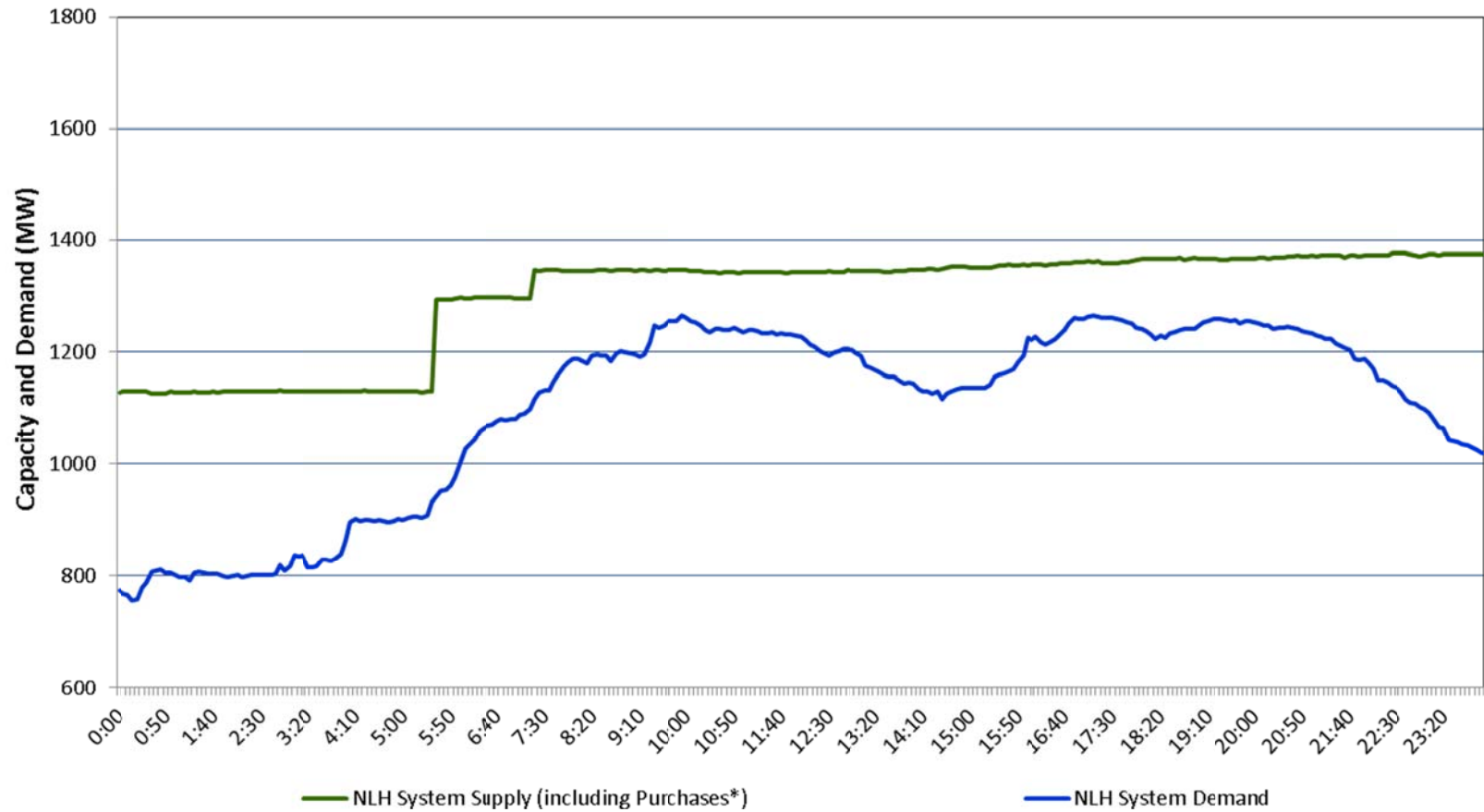
* Purchases include Nalcor Exploits and Star Lake, Rattle Brook, CBPP Co-Gen, Wind Generation, and CBPP Curtailable Load (60 MW)

Newfoundland and Labrador Hydro NLH System Supply and Demand January 5, 2014



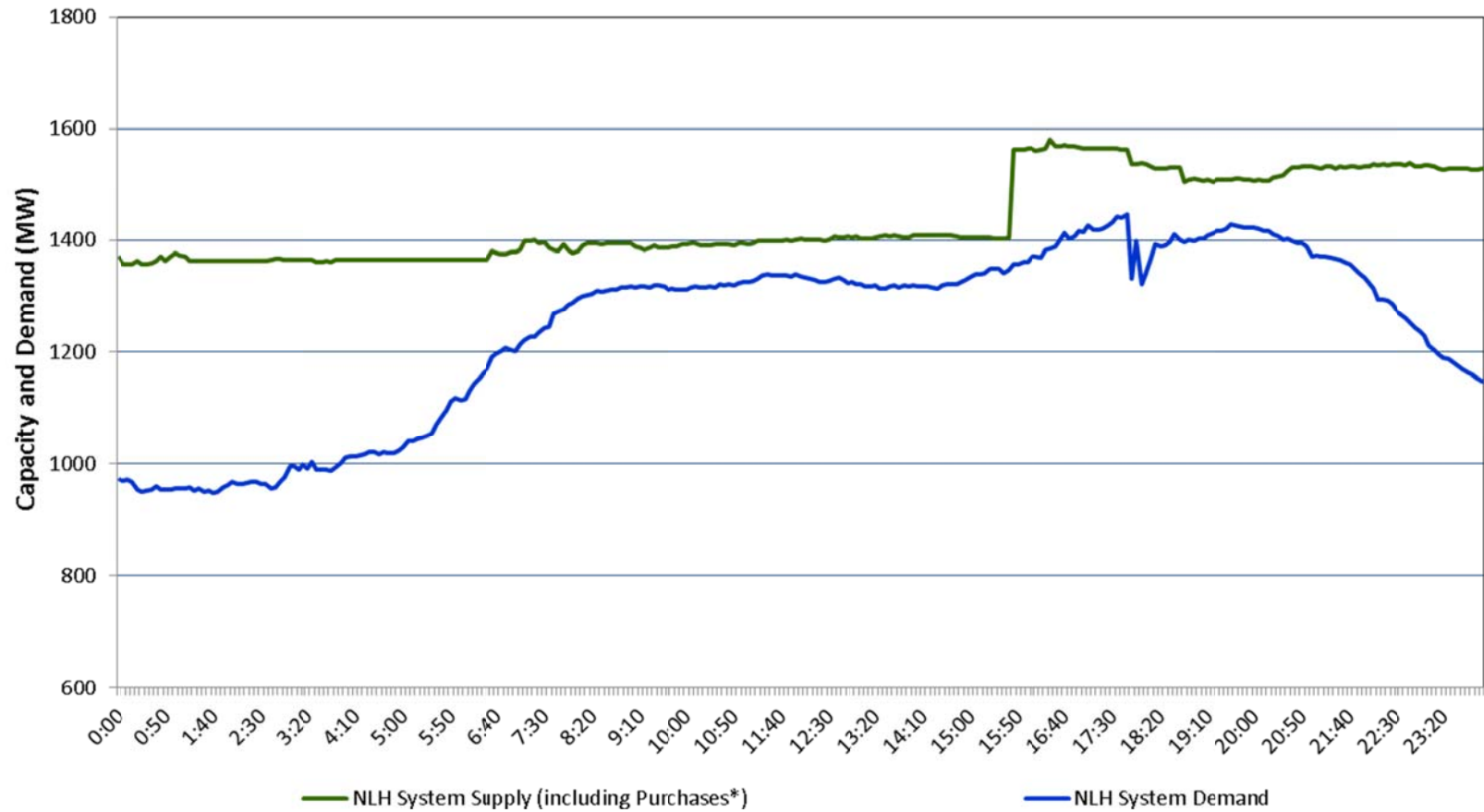
* Purchases include Nalcor Exploits and Star Lake, Rattle Brook, CBPP Co-Gen, Wind Generation, and CBPP Curtailable Load (60 MW)

Newfoundland and Labrador Hydro NLH System Supply and Demand January 6, 2014



* Purchases include Nalcor Exploits and Star Lake, Rattle Brook, CBPP Co-Gen, Wind Generation, and CBPP Curtailable Load (60 MW)

Newfoundland and Labrador Hydro NLH System Supply and Demand January 8, 2014



* Purchases include Nalcor Exploits and Star Lake, Rattle Brook, CBPP Co-Gen, Wind Generation, and CBPP Curtailable Load (60 MW)

Events on January 11, 2013

Delivery Point Affected	Start Time	Finish Time	Duration of Interruptions (mins)	MW Load	MW-Mins
Deer Lake Power - TL225	1/11/2013 7:43	1/11/2013 11:52	249.00	0.00	0.00
Deer Lake - NP	1/11/2013 7:43	1/11/2013 11:43	240.00	12.67	3,040.80
Port Aux Basques	1/11/2013 7:43	1/11/2013 11:20	217.00	15.74	3,415.58
Doyles	1/11/2013 7:43	1/11/2013 11:20	217.00	3.94	854.98
Grandy Brook	1/11/2013 7:43	1/11/2013 12:07	264.00	3.70	976.80
Bottom Brook - 400L	1/11/2013 7:43	1/11/2013 12:07	171.00	0.00	0.00
Stephenville	1/11/2013 7:43	1/11/2013 10:34	171.00	34.37	5,877.27
Massey Drive Bus B3 (1)	1/11/2013 7:43	1/11/2013 8:01	18.00	65.26	1,174.68
Massey Drive Bus B3 (2)	1/11/2013 8:10	1/11/2013 9:45	95.00	34.62	3,288.90
Massey Drive Bus B3 (3)	1/11/2013 7:43	1/11/2013 9:45	122.00	30.64	3,738.08
Massey Drive Bus B4	1/11/2013 7:43	1/11/2013 11:58	255.00	35.46	9,042.30
Wiltondale (1)	1/11/2013 7:43	1/11/2013 9:19	96.00	0.11	10.23
Glenburine (1)	1/11/2013 7:43	1/11/2013 9:19	96.00	2.13	204.67
Rocky Harbour (1)	1/11/2013 7:43	1/11/2013 9:19	96.00	3.09	296.77
Wiltondale (2)	1/11/2013 9:40	1/11/2013 9:47	7.00	0.05	0.36
Glenburine (2)	1/11/2013 9:40	1/11/2013 9:47	7.00	1.03	7.20
Rocky Harbour (2)	1/11/2013 9:40	1/11/2013 9:47	7.00	1.49	10.43
South Brook	1/11/2013 7:43	1/11/2013 7:48	5.00	3.79	18.95
Duck Pond Mine	1/11/2013 7:43	1/11/2013 23:59	976.00	8.57	8,364.32
St. Anthony	1/11/2013 8:01	1/11/2013 8:32	31.00	7.31	226.61
Roddickton	1/11/2013 8:01	1/11/2013 8:30	29.00	1.66	48.14
Cobb's Pond	1/11/2013 7:43	1/11/2013 9:12	89.00	60.00	5,340.00
Farewell Head	1/11/2013 7:43	1/11/2013 9:12	89.00	3.00	267.00
Glenwood	1/11/2013 7:43	1/11/2013 9:12	89.00	3.00	267.00
Grand Falls	1/11/2013 7:43	1/11/2013 10:03	140.00	60.00	8,400.00
Sunnyside - 100L	1/11/2013 7:43	1/11/2013 9:03	80.00	10.25	820.00
Sunnyside - 109L	1/11/2013 7:43	1/11/2013 9:03	80.00	11.81	944.80
Holyrood - 39L	1/11/2013 6:42	1/11/2013 6:43	1.00	0.00	0.00
Hardwoods (1)	1/11/2013 7:43	1/11/2013 8:00	17.00	159.72	2,715.24
Hardwoods (2)	1/11/2013 8:51	1/11/2013 9:14	23.00	108.09	2,486.07
Oxen Pond (1)	1/11/2013 6:48	1/11/2013 7:11	23.00	171.00	3,933.00
Oxen Pond (2)	1/11/2013 7:43	1/11/2013 8:03	20.00	115.49	2,309.80
Oxen Pond (3)	1/11/2013 8:51	1/11/2013 9:31	40.00	110.88	4,435.20
		Totals	4,020.00	967.99	72,515.19