



Preliminary 2010 Revenue Requirements

Appendix E

**Distribution Substation Automation
Effectiveness Report**

1 **Annual Program Effectiveness Report**

2 **Direct Reliability Improvements**

3 Direct reliability improvements include reductions in SAIDI, Momentary Average
4 Interruption Frequency Index (“MAIFI”), SAIFI, and Customer Average Interruption
5 Duration Index (“CAIDI”). At this time there is nothing to report as there is insufficient
6 data from the program to determine detailed reliability improvements.

7 However, it should be highlighted that the benefits provided by the program greatly
8 improved FortisBC’s ability to respond to severe capacity constraints during recent
9 system peaks. For example, both the Ellison and Black Mountain Substations have
10 been delayed from their original in-service dates. The absence of these stations,
11 combined with 40-year record cold temperatures last winter and an extended heat wave
12 during the summer tested the Kelowna-area system to its capacity limits.

13 The ability to view individual feeder loadings in real-time allowed FortisBC staff to
14 optimize the available distribution system capacity. Rather than reacting to outages
15 caused by unexpected feeder overloads, proactive measures such as load transfers
16 prevented any feeder overload outages from occurring during these recent peak
17 periods.

18 **Reduction of Travel Costs**

19 A reduction of travel costs is accomplished by reducing crew vehicle usage. It is
20 estimated that vehicle costs have been reduced by approximately \$22,000 to date, as
21 seen in Table 1 below.

Table 1: Reduction of Travel Costs

Station	Date of Automation	Return Trip Time (Min)	Time Saved After Automation (Hrs)	Hourly Service Truck Rate	Reduction of Travel Costs
Keremeos	6-Sep-07	90	132	\$37	\$4,892
Saucier	31-Dec-07	60	66	\$37	\$2,446
Fruitvale	24-Oct-08	120	88	\$37	\$3,261
Castlegar	24-Nov-08	30	33.5	\$37	\$1,242
Duck Lake	4-Dec-08	90	49.5	\$37	\$1,834
Bell Terminal	10-Dec-08	60	72	\$37	\$2,668
Valhalla	8-Jun-09	180	27	\$37	\$1,001
OK Mission	11-Jun-09	60	20	\$37	\$741
Hollywood	18-Jun-09	60	32	\$37	\$1,186
Passmore	2-Jul-09	120	70	\$37	\$2,594
Blueberry	4-Aug-09	30	4	\$37	\$148
Total			594		\$22,014

1 **Safety Improvements**

2 Employee safety has improved due to reduced travel during adverse weather
3 conditions.

4 After implementation of the program improvements at OK Mission Substation, the
5 Transformer 1 load tap-changer (“LTC”) began to exhibit signs of imminent failure.
6 Early indication of the situation was provided by the transformer load-monitoring
7 equipment. This enhanced visibility provided conclusive evidence of a failure in-
8 progress. Immediate offloading of the transformer prevented the minor problem from
9 escalating to a major failure which could have resulted in significant customer outages
10 or substantial damage to the transformer (with its associated risks to personnel and the
11 environment). In the end, the transformer LTC was repaired and returned to service in
12 less than three days.

13 **Improved Operating Efficiency**

14 Reduced recloser tagging costs is the primary driver in improving operating efficiency.
15 It is estimated that recloser tagging costs have been reduced by approximately \$42,000
16 to date. Detailed savings are displayed in Table 2 below.

Table 2: Improved Operating Efficiency after Automation

Station	Date of Automation	Time Saved After Automation (Hrs)	Hourly Crew PLT Rate (Blended)	Improved Operating Efficiency After Automation
Keremeos	6-Sep-07	132	\$71	\$9,400
Saucier	31-Dec-07	66	\$71	\$4,700
Fruitvale	24-Oct-08	88	\$71	\$6,266
Castlegar	24-Nov-08	33.5	\$71	\$2,386
Duck Lake	4-Dec-08	49.5	\$71	\$3,525
Bell Terminal	10-Dec-08	72	\$71	\$5,127
Valhalla	8-Jun-09	27	\$71	\$1,923
OK Mission	11-Jun-09	20	\$71	\$1,424
Hollywood	18-Jun-09	32	\$71	\$2,279
Passmore	2-Jul-09	70	\$71	\$4,985
Blueberry	4-Aug-09	4	\$71	\$285
Total		594		\$42,299

- 1 Based upon the previous two years the average improved operating efficiency per year
 2 is presently estimated at \$82,000 for Stations currently in service, as demonstrated in
 3 Table 3.

Table 3: Average Improved Operating Efficiency

Station	Number of GNRs 2007	Number of GNRs 2008	Average Number of GNRs Per Year	Average Time Saved Per Year After Automation (Hrs / Yr)	Average Improved Operating Efficiency Per Year
Keremeos	55	36	46	68.25	\$7,389
Saucier	25	36	31	30.5	\$3,302
Fruitvale	75	47	61	122	\$13,209
Castlegar	45	119	82	41	\$4,439
Duck Lake	50	168	109	163.5	\$17,702
Bell Terminal	76	78	77	77	\$8,337
Valhalla	5	5	5	15	\$1,624
OK Mission	97	154	126	125.5	\$13,588
Hollywood	73	83	78	78	\$8,445
Passmore	6	16	11	22	\$2,382
Blueberry	42	34	38	19	\$2,057
Total	549	776	663	761.75	\$82,475

4 Identification of Reduction System Losses and Peak Demand by Power Factor 5 Improvement

- 6 At this time there is nothing to report. There is insufficient data from the program to
 7 determine system reduction losses.

1 **Summary of Substation Alarms, Outcomes and Response Time**

2 At present the electronic log of substation alarms is kept for 45 days by the FortisBC
3 System Control centre. Response time is not tracked. Once implemented the Data
4 Historian component of the program will provide this information.

5 **Guarantee of Non Reclose (“GNR”) Permits Issued by Remote-Control**

6 To date 474 GNR permits have been issued by remote-control. See Table 4 below.

Table 4: Average GNR Permits per Year

Station	Date of Automation	Number of GNRs Before Station Automation	Number of GNRs After Station Automation	Number of GNRs 2007	Number of GNRs 2008	Average Number of GNRs Per Year
Keremeos	6-Sep-07	20	88	55	36	46
Saucier	31-Dec-07	26	66	25	36	31
Fruitvale	24-Oct-08	206	44	75	47	61
Castlegar	24-Nov-08	458	67	45	119	82
Duck Lake	4-Dec-08	205	33	50	168	109
Bell Terminal	10-Dec-08	150	72	76	78	77
Valhalla	8-Jun-09	301	9	5	5	5
OK Mission	11-Jun-09	296	20	97	154	126
Hollywood	18-Jun-09	304	32	73	83	78
Passmore	2-Jul-09	363	35	6	16	11
Blueberry	4-Aug-09	246	8	42	34	38
Total		2575	474	549	776	663

7 **System Loss Analysis Report**

8 At this time there is insufficient data from the program to determine system losses.