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October 1, 2010

Via Email
Original via mail

Ms. Erica M. Hamilton
Commission Secretary
BC Utilities Commission
Sixth Floor, 900 Howe Street, Box 250
Vancouver, BC V6Z 2N3

Dear Ms. Hamilton:

Re: ***FortisBC Inc. ("FortisBC") Application for Approval of the 2011 Capital Expenditure Plan Project No. 3698603 - Responses to Information Requests***

Please find attached FortisBC's responses to Information Requests received from the British Columbia Utilities Commission, British Columbia Old Age Pensioners' Organization et al., British Columbia Municipal Electric Utilities, British Columbia Sustainable Energy Association, Mr. Norman Gabana, and Mr. Hans Karow.

Sincerely,

Dennis Swanson
Director, Regulatory Affairs

cc: Registered Intervenors

1.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A2.1 – A2.5 Capital Expenditures and Customer Growth

The following table is compiled by Commission staff from information provided by FortisBC:

	2007	2008	2009	2010	2011	2012
Customer growth	1.7%	1.9%	1.0%	1.5%*	1.6%	1.7%
Capital Additions	13%	11%	10%	12%	?	?
* from FortisBC 2010 Revenue Requirement Application, Tab 2, p.3						

Q1.1 FortisBC's customer growth and capital additions have been relatively steady over the last four years. Please discuss why its capital additions have been substantially higher in proportionate to its customer growth?

A1.1 The capital expenditures were required to address capacity and condition-related issues throughout the system in recent years. Prior to this period, system load growth was accommodated by incremental capital additions as well as reconfiguration of the system to ensure the maximum use of installed capacity. However, as system load growth has continued, this optimization has resulted in capacity violations occurring in many areas of the FortisBC system within a short timeframe. Resolving these capacity deficits has required the addition of capital infrastructure throughout the service territory such as new substations and large transmission reinforcement projects.

2.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A10.2 Section 2 Generation, p. 18 Small Sustaining Projects – Upper Bonnington Extension Power House Crane Upgrade

Q2.1 How old is this crane i.e. is it the original crane when the powerhouse was built?

A2.1 This is the original crane that was installed in 1940 when the extension to the Upper Bonnington plant was constructed.

3.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A11.2 and A18.1
Sustaining Projects – Transmission and Distribution Line Condition Assessment

Q3.1 Does FortisBC agree that activities which "extend the life of the pole" should be considered capital costs while activities that "ensure the integrity of the lines" should be routine operating costs? Please explain why or why not.

A3.1 The Company agrees that activities related to extending the life of an asset should be considered capital costs. FortisBC also performs annual line patrols on all lines which are treated as routine operating costs. The primary function of the Condition Assessment program is to "ensure the integrity of the lines" by the act of inspection and testing. Inspections and testing provide the basis for the development of capital expenditure programs (e.g. pole replacements) in subsequent years. However FortisBC does not consider that a distinction is to be made in which activities that "ensure the integrity" of its assets are non-capital in nature. As noted in the Company's response to BCUC IR No. 1 Q11.2 and Q18.1, the Transmission and Distribution Line Condition Assessment programs both extend the life of and insure the integrity of the lines.

These programs have previously been approved as capital by the Commission, at minimum, since the Company entered into the current term of the Performance Based Regulation mechanism (Order G-58-06), and therefore the treatment of these capital components cannot be changed without impacting the formulaic Operating and Maintenance component of revenue requirements.

"Condition assessment is the preliminary investigative phase for scoping the capital replacements required in subsequent years. As this program is concerned with plant replacement and life extension these are capital costs." (BCUC 11.4)

Q3.2 Depending on the current age of each pole, it is possible that all condition assessments could lead to capital replacements. Does FortisBC engage condition assessment on <u>all</u> existing poles annually?

A3.2 No, the condition assessment program is based on an eight year cycle of inspecting and testing all FortisBC transmission and distribution line facilities.

Q3.2.1 What if no capital replacements are recommended on poles of a newer vintage but simply regular maintenance to ensure integrity of the system, would this activity still be considered a capital cost?

A3.2.1 Any work identified through the condition assessment will be assessed in accordance with FortisBC capitalization policy to determine whether that work is O&M or capital in nature. Please also refer to the response to BCUC IR No. 2 Q3.1 above.

4.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A13.1-A13.5 and A21.1-A21.4
Sustaining Projects – Right-of-Way Reclamation

FortisBC explains that expanding the "tree-free zones increase clearance improving both safety and reliability of the …system"

Q4.1 Does FortisBC agree that this activity is a form of preventative maintenance? Please discuss.

A4.1 No. Expanding the tree-free zones is a capital activity. FortisBC has a long established policy of capitalizing the cost of establishing, expanding or re-establishing rights-of-way including the initial removal of trees. Annual or cyclical brushing is treated as an operating expenditure. As provided in response to BCUC IR No. 1 Q13.1, there is a long term benefit from this program, which has previously been approved as capital by the Commission (G-147-06, G-11-09), at a minimum, since the Company entered into the current term of the Performance Based Regulation mechanism (Order G-58-06), and therefore the treatment of this capital component cannot be changed without impacting the formulaic Operating and Maintenance component of the annual revenue requirement.

Q4.2 FortisBC states that "future expenditures (are) based on historical averages." In support of this claim, does FortisBC agree that the 4-year historical average (2007-2010) for Distribution Right-of-way Reclamation is $617,000 and therefore the 2011 forecast should be adjusted to this average? Explain why or why not.

A4.2 No, the Company does not agree that the 4-year historical average for Distribution Right-of-Way Reclamation is $617,000. The calculation of $617,000 is based on various forecast values, and not

on historical expenditures. FortisBC believes that the current method of basing the forecast on prior three year actual costs (2007 – 2009), adjusted for inflation and changes in overhead loadings, is the appropriate method because it is based entirely on known, not forecast, values.

The Company notes that the 2011 values calculated for its sustaining capital projects are affected by an increase in the rate of capitalized overheads to be applied in 2011, compared to the 2007 – 2009 period. This is a result of the Company's current PBR Plan (Order G-58-06 and G-193-08), which sets capitalized overhead at 20 percent of gross Operating and Maintenance Costs, which is applied on a pro rata basis by project, and a lower value of 2011 capital expenditures, before loadings, compared to recent years.

5.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A15.1.2 Section 3 Transmission and Stations, pp.30-34 Sustaining Projects – Station Sustaining Programs and Projects, Battery bank

Q5.1 Please separate the station battery replacement cost components into materials, labour, disposal, IDC etc. to arrive at the total cost of $100K.

A5.1 The requested breakdown is provided in Table BCUC IR2 A5.1 below.

Table BCUC IR2 A5.1

Category Description	Material	Labour	Other *
	($000s)		
Civil & Site	$ 4.5	$ 13.0	$ 4.3
Station Equipment	$ 36.5	$ 18.0	$ 3.4
Engineering	$ -	$ 14.0	$ -
Commissioning	$ -	$ 3.0	$ 1.4
Subtotal (Capital Additions)			$ 98.1
Cost of Removal			$ 1.5
Project Total			$ 98.1
* - includes contracts, vehicle usage and contingency			

Q5.2 Is the charger being replaced as part of the project? If not, why not? Please discuss FortisBC's experience with aging battery chargers and indicate expected life.

A5.2 Yes, battery chargers are normally replaced with the battery bank. Aging chargers can fail prematurely and potentially damage the battery bank associated with them, which can then require replacement of the charger and some or all of the batteries. Regular station inspections monitor charging current and ripple voltage to help identify problems with aging chargers before significant damage to the batteries occurs. The expected life of a charger is

approximately 20 years.

6.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A15.4 Station Condition Assessments and Minor Planned Projects - Addition of Arc-Flash Detection to Legacy Metal-Clad Switchgear

Q6.1 Please confirm that reliance on a relay to open or block is considered sufficient primary protection for operating personnel.

A6.1 Primary protection for operating personal is only provided by a lockout device that renders the primary source of hazardous energy mechanically and electrically disconnected. Relays are included in the category of control circuits which offer secondary protection. Where arc-flash detection relays have been implemented, they constitute a secondary level of protection for operating personnel.

Q6.2 What is the risk of the funds for this project becoming a stranded investment if FortisBC decides to replace the Metalclad switchgear with arc resistant switchgear to improve safety, please discuss?

A6.2 The risk of the arc-flash detection relays becoming stranded is mitigated by the benefit the devices have in protecting metal-clad switchgear from damage associated with arc-flash incidents. While arc flash detection relays are primarily being installed as an employee safety measure, the devices also substantially reduce the amount of energy released during arc-flash incidents, thereby reducing damage to equipment and the corresponding repair time.

FortisBC still intends to conduct switchgear replacement where overall condition and safety requirements necessitate such replacement. However, the installation of arc flash detection will

allow FortisBC to defer these projects.

In A15.4.3 FortisBC states "Proper safety procedures include only working on de-energized equipment (which may have reliability impacts) and wearing personal protective equipment."

Q6.3 If proper safety procedures include only working on de-energized equipment, please explain why arc-flash detection is required and provide the alleged reliability impacts.

A6.3 The referenced statement was intended to suggest that working on de-energized equipment was one possible method of eliminating arc-flash hazards; it was not intended to suggest that FortisBC safety procedures will only allow work in the vicinity of fully de-energized switchgear. In reality, it is impractical to require metal-clad switchgear to be fully de-energized in all cases prior to allowing personnel to work in the vicinity.

As an example, one very common switching operation in metal-clad switchgear is to disconnect ("rack out") a circuit breaker in order to provide isolation for downstream distribution equipment. While metal-clad switchgear is designed to allow breakers to be racked-out from an energized bus, industry experience has also shown that this is a potentially hazardous operation as arc-flash incidents can occur during the rack-out procedure. Since the breaker removal must be done manually, personnel will be in the vicinity if an arc-flash does result. As discussed, one possible method to mitigate this risk would be to fully de-energize the switchgear bus prior to starting work, but this would also result in an outage to all other circuits supplied from the bus. Since many FortisBC metal-clad installations only have one switchgear bus, this would result in a complete station outage. Since racking-out breakers for isolation purposes is a common procedure,

the resulting planned station outages would have significant customer reliability impacts (increased SAIDI and SAIFI) if bus de-energization was used as an arc-flash mitigation method.

7.0 Reference: Exhibit B-1, Table 4.1, Distribution Projects, p. 35

Q7.1 Provide the forecasted and actual expenditures for each line in Table 4.1 for the years 2007 through 2012.

A7.1 Please see Table BCUC IR2 A7.1 below.

Table BCUC IR2 A7.1

	2007		2008		2009		2010		2011	2012
	Forecast G-147-06	Actual	Forecast G-147-06	Actual	Forecast G-11-09	Actual	Forecast G-11-09	Current Estimate	Forecast	Forecast
Growth										
New Connects - System Wide	7,245	8,843	7,977	12,697	9,788	8,693	10,670	9,495	10,581	-
Distribution Growth Projects	3,961	5,089	2,534	2,752	788	1,853	3,280	2,894	-	-
Unplanned Growth Projects	685	1,063	713	832	974	596	994	895	948	-
Subtotal Growth	11,892	14,994	11,224	16,281	11,550	11,141	14,944	13,284	11,529	-
Sustaining										
Distribution Urgent Repair	1,228	2,270	1,414	1,998	1,911	3,073	1,805	4,950	2,274	-
Distribution Line Condition Assessment	637	928	678	692	599	659	667	641	938	-
Distribution Line Rehabilitation	1,606	1,232	1,645	3,000	2,848	2,634	3,209	2,513	2,331	-
Distribution Line Rebuilds	1,576	1,470	1,945	1,284	1,178	1,056	1,167	935	1,783	-
Distribution Right-of-Way Reclamation	609	641	593	327	621	558	646	581	578	-
Distribution Right-of-Way Acquisition [1]	-	162	-	198	-	160	-	-	-	-
Distribution Pine Beetle Hazard Tree Removal	-	-	-	-	722	1,721	551	496	1,913	-
Small Planned Capital	339	1,030	378	481	668	596	747	672	802	-
Forced Upgrades and Line Moves	1,168	1,565	1,400	385	1,255	1,908	1,461	3,277	1,456	-
PCB Testing Program	852	962	868	92	700	152	700	700	-	-
Aesthetic & Environmental Upgrades	98	6	100	17	-	-	-	-	-	-
PLP Capital	-	-	800	-	-	-	-	-	-	-
Glenmerry Underground	-	151	-	-	-	-	-	-	-	-
Subtotal Sustaining	8,114	10,417	9,821	8,474	10,502	12,517	10,953	14,765	12,075	-
Total	20,006	25,411	21,045	24,755	22,052	23,658	25,897	28,049	23,604	-

[1] For forecast purposes, Distribution Right-of-Way Acquisition is included in Transmission expenditures.

G-147-06 – FortisBC 2007/2008 Capital Expenditure Plan
G-11-09 – FortisBC 2009/2010 Capital Expenditure Plan

8.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A16.1 Distribution Projects – Unplanned Growth Projects

Q8.1 FortisBC states that "future expenditures (are) based on historical averages." In support of this claim, does FortisBC agree that the 4-year historical average (2007-2010) for Unplanned Growth Projects is $841,000 and therefore the 2011 forecast should be reduced to this average? Explain why or why not.

A8.1 No, the Company does not agree that the 4-year historical average for Unplanned Growth Projects is $841,000. The calculation of $841,000 is based on various forecast values, and not on historical expenditures. FortisBC believes that the current method of basing the forecast on prior three year actual costs (2007 – 2009), adjusted for inflation and changes in overhead loadings, is the appropriate method because it is based entirely on known, not forecast, values.

Please also see the response to BCUC IR No. 2 Q4.2 above.

9.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1, A17.1, p. 37 Distribution Sustaining Programs and Projects - Distribution Urgent Repairs

FortisBC response was "A15.3.1 Station Urgent Repairs are not discretionary in nature. These projects are capital in nature and the introduction of deferral accounts would only create an administrative burden for work that has to be completed regardless. Please also refer to the response to BCUC IR1 Q8.1 above."

Q9.1 Please provide the forecasted administrative burden amount for distribution urgent repairs?

A9.1 The Company does not have a forecast for the administrative burden that deferral accounts would create. The burden would include additional accounting effort for the set-up of deferred costs, additional regulatory effort to apply for disposition of the costs and additional accounting effort to amortize the cost of the deferred charges, all for non-discretionary work that has to be completed regardless of accounting treatment.

10.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A18.4 Distribution Projects – Distribution Line Condition Assessment

Q10.1 FortisBC states that "future expenditures (are) based on historical averages." In support of this claim, does FortisBC agree that the 4-year historical average (2007-2010) for Distribution Condition Line Assessment is $645,000 and therefore the 2011 forecast should be reduced to this average? Explain why or why not.

A10.1 No, the Company does not agree that the 4-year historical average for Distribution Line Condition Assessment is $645,000. The calculation of $645,000 is based on various forecast values, and not on historical expenditures. FortisBC believes that the current method of basing the forecast on prior three year actual costs (2007 – 2009), adjusted for inflation and changes in overhead loadings, is the appropriate method because it is based entirely on known, not forecast, values.

Furthermore, the cost of this program is not calculated solely by a rolling average method. As stated on page 39 of the Application (Exhibit B-1), the estimates are also based on the Company's knowledge of the distribution lines being assessed. The costs of performing condition assessment vary from line to line depending upon factors including the length of line segment being addressed, the proportion of the line requiring treatment, and the terrain. These factors are taken into consideration when calculating the forecast expenditures.

Please also see the response to BCUC IR No. 2 Q4.2 above.

11.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A12.2-A12.3 and A20.1-A20.2
Sustaining Projects – Transmission and Distribution Line Rehabilitation / Rebuilds

"This project does extend the useful life of the existing…system and may also include the replacement of defective parts" (A12.2)

"This project will maintain normal operating conditions of the system and extend the life of the asset." (A12.3)

Q11.1 According to FortisBC's Capitalization Policy, an activity is either classified as capital or O&M expense based on a set of criteria. The above responses appear to suggest that these activities may be both capital and O&M. Please discuss how this is possible.

A11.1 The activities may be either capital or operating in nature, but not both, in accordance with the Company's capitalization policy. Expenditures required to maintain the normal operating condition of the electrical system can be capital in nature. For example, the replacement of poles as a result of the condition assessment program or even a complete substation replacement due to condition issues only would be considered capital and necessary in order to maintain normal operating conditions of the system.

The Transmission Line Rehabilitation and Distribution Line Rehabilitation and Rebuild programs generate long term benefits, and have previously been approved as capital by the Commission, at a minimum, since the Company entered into the current term of the Performance Based Regulation mechanism (Order G-58-06), and therefore the treatment of these capital components cannot be changed without impacting the formulaic Operating and Maintenance

component of the annual revenue requirement.

As stated in the response to BCMEU IR No. 1 Q7.1, the accounting treatment of FortisBC's capital programs has remained consistent throughout the term of the PBR Plan.

Q11.2 Does FortisBC have a secondary criteria check to make a determination whether the activity should be classified as capital or O&M? Please discuss.

A11.2 As a function of the budget approval process capital budgets are reviewed by management at various levels to ensure that unauthorized or inappropriate items (i.e. operating items) are not included in the departmental capital budget submissions.

Q11.3 FortisBC states that "future expenditures (are) based on historical averages." In support of this claim, does FortisBC agree that the 4-year historical average (2007-2010) for Distribution Line Rebuilds is $1.467 million and therefore the 2011 forecast should be reduced to this average? Explain why or why not.

A11.3 No, the Company does not agree that the 4-year historical average for Distribution Line Rebuilds is $1.467 million. The calculation of $1.467 million is based on various forecast values, and not on historical expenditures. FortisBC believes that the current method of basing the forecast on prior three year actual costs (2007 – 2009), adjusted for inflation and changes in overhead loadings, is the appropriate method because it is based entirely on known, not forecast, values.

Furthermore, the costs of this program are not based solely on a rolling average method. The expenditures are based on a list of

projects estimated based on experience and historical pricing averaged over the area. This category contains a number of discrete projects and the effort required to undertake detailed cost estimations for each would be significant compared to the value of the projects themselves. For these reasons, the cost estimates are derived from a combination of unit costing methodology, and historical expenditures on similar projects.

Please also see the response to BCUC IR No. 2 Q4.2 above.

12.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A19.1 Distribution Sustaining Programs and Projects - Distribution Line Rehabilitation "Hot Tap Connector Replacement" Project

In the Decision to Order G-165-08, FortisBC's Copper Conductor Replacement Project CPCN was rejected. The Commission Panel made a determination that specific conditions in FortisBC's legacy system, including factors such as hot taps, should be addressed in the normal course of operations and maintenance.

Q12.1 Please clarify whether FortisBC believes that the Panel's decision to reject the Copper Conductor Replacement Project CPCN does not apply to future Hot Tap Replacement projects simply because G-11-09 did not specifically and repeatedly address this issue?

A12.1 No. The hot tap replacements included in the 2009-2010 Capital Expenditure Plan are not related to the proposed Copper Conductor Replacement program. The Hot Tap Connector Replacement initiative was introduced in the 2009-2010 Capital Expenditure Plan as part of the Distribution Line Rehabilitation Program, and was intended to address all hot tap connectors not associated with copper conductor identified for replacement. As was noted in the response to BCUC IR No. 1 Q67.1 from FortisBC's 2009/10 Capital Expenditure Plan, the funds associated with the hot tap connectors were not included in the Copper Conductor Replacement Project because the majority of the connectors are associated with aluminum conductor and can be replaced more efficiently within the Distribution Line Rehabilitation Project. In the response to BCUC IR No. 2 Q154.1 (2009-2010 Capital Expenditure Plan), the Company

estimated that approximately 44,000 Hot Tap Connectors would be replaced through the program.

The 2009 and 2010 Distribution Line Rehabilitation expenditures identified incremental funding of $750,000 in each year for hot tap connector replacement required on distribution lines regardless of the conductor type. These are the expenditures referred to in the response to BCUC IR No. 1 Q19.1. Those incremental expenditures for 2009 and 2010 were included in the value of Distribution Line Rehabilitation expenditures approved by Order G-11-09.

Q12.1.1 Please explain why FortisBC did not seek clarification or reconsideration of the Decision issued concurrently with G-11-09 if it did not fully comprehend the Decision that all components, copper conductor replacement and hot taps, were denied.

A12.1.1 It is clear to FortisBC that the Commission did not deny all hot tap connector replacements. As discussed in the response to BCUC IR No. 2 Q12.1 above, the Hot Tap Connector Replacement initiative was introduced during the 2009-2010 Capital Expenditure Plan as part of the Distribution Line Rehabilitation Program, and was intended to address all hot tap connectors regardless of conductor type (copper or aluminum). This includes hot taps installed on No. 3 and No. 4 copper conductor which were not the subject of the Copper Conductor Replacement Application. Please also see the response to BCUC IR No. 2 Q12.2 below.

FortisBC indicated its intention to undertake copper

conductor-related work, on a priority basis, within its capital program in its 2010 Revenue Requirements filing. On page 7 of that application, the Company stated that 2009 Distribution Sustaining capital expenditures included $1.5 million required for replacement of copper conductor. At page 12 of the same application, $3.6 million in 2010 capital expenditures were identified for replacement of copper conductor in locations presenting significant risk to public and employee safety due to conductor failure. The 2010 Revenue Requirements were approved by Commission Order G-162-09 dated December 17, 2009.

Q12.2 Equally, did FortisBC receive specific "approval" for the Hot Tap Connector Replacement project in Order G-11-09? If so, please provide the line reference in the Decision.

A12.2 Yes, Order G-11-09 did specifically approve incremental expenditures for hot tap connector replacement as part of the Distribution Line Rehabilitation expenditures (Project 15 of the Distribution Projects Expenditure Table in the 2009-2010 Capital Expenditure Plan), as discussed in the response to BCUC IR No. 2 Q12.1 above. This approval is indicated on page 21 of the Decision: "With the exception of projects 7, 23, 24 and 25, discussed below, the Commission Panel determines that the projects listed are to be approved as part of the FortisBC CEP Application".

In FortisBC's response, it indicated that it amended its 2009-2010 Capital Expenditure Plan in response to BCOAPO Q16.2 (Exhibit B-4) and sought approval for expenditures of $2.848 million in 2009 and $3.209 million in 2010.

Q12.3 Please explain why FortisBC assumed that amending an amount for expenditure could be done in response to an Intervener information request, rather than through an errata as is common practice.

A12.3 The Company identified in response to BCOAPO Q16.2 in the 2009 – 2010 Capital Expenditure Plan process that a correction was needed to the Distribution Line Rehabilitation forecast, but did not file an erratum at that time due to an oversight. The BCOAPO requested in its Final Submission that FortisBC confirm its intention to implement the correction. Since the evidentiary record was by then closed, FortisBC confirmed in its Reply Submission that the correction would be made (unless, of course, the Commission's decision directed otherwise).

In the Decision issued concurrently with G-165-08, the Commission Panel believed that FortisBC should be addressing these on a priority basis in the normal course of the operations and maintenance of its system. In the Decision issued concurrently with G-11-09, "…the Commission Panel believes that Fortis BC should be addressing these on a priority basis in the normal course of the operations and maintenance of its system."

Q12.4 As page 17 of the Decision issued concurrently with G-11-09 dealt with factors such as hot taps, splices, or other circumstances, has FortisBC incorrectly proceeded with the expenditure of $2.634 million that should be in the operations and maintenance budget? Please explain.

A12.4 Page 17 of the Decision issued concurrently with G-11-09 was with respect to the proposed 20 Line and 27 Line rebuild projects, insofar

as a "do nothing approach" was not acceptable as these proposed projects were denied by G-11-09.

The question suggests that the entire Distribution Line Rehabilitation budget for 2009 should have been absorbed in Operating and Maintenance cost. As stated above, the reference to page 17 of G-11-09 was only applicable to the identified transmission rebuild projects, and not the Distribution Line Rehabilitation program. This program has previously been approved as capital by the Commission (G-147-06, G-11-09), at minimum, since the Company entered into the current term of the Performance Based Regulation mechanism (Order G-58-06), and therefore the treatment of this capital component cannot be changed without impacting the formulaic Operating and Maintenance component of revenue requirements. FortisBC does not believe that the Commission intended such a result in G-11-09.

Q12.5 Please provide the total expenditure in 2010 for this program.

A12.5 The total expenditure in 2010 for the Hot Tap Connector Replacement initiative is $750,000.

13.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1, A20.3, p. 42 Distribution Sustaining Programs and Projects - Distribution Line Rebuilds

Q13.1 Commission staff calculate the three year actual historical average as $1.27 million. Please confirm the calculation and justify the increase in F2010/11.

A13.1 FortisBC confirms the calculation. The category contains a number of discrete projects, the quantity of which depends on the necessary work identified through site assessments and normal daily operations, which can vary from year to year. The costs of distribution line rebuilds varies from line to line depending upon various factors including the length of line segment being addressed as well as the terrain. Estimated expenditures for this program are based on historical averages for similar work performed.

Please also see the response to BCUC IR No. 2 Q4.2 above.

Q13.2 Explain the under run in F2008.

A13.2 The under run in 2008 was due to resource constraints. Although FortisBC forecasts expenditures with a consideration for available resources, certain projects may be delayed in order to address more critical work, including projects that were capacity driven (customers would not have power if the work was not completed).

Q13.2.1 Was this amount of $475,000 ever deducted in future applications?

A13.2.1 FortisBC assumes the amount referenced in Q13.2.1 should read “$661,000” as this was the variance between forecast and actual expenditures for 2008.

There was no need to make a deduction in future

revenue requirements applications as only the actual expenditures were added to the rate base upon which customer rates are set.

Any adjustments to future capital expenditure applications would be inherent as the forecasts are based on actual expenditures.

14.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1, A21.5, p. 45 Distribution Sustaining Programs and Projects - Distribution Right-of-Way Reclamation

Q14.1 Commission staff calculate the three year actual historical average as $0.508 million. Please confirm the calculation and justify the increase in F2010/11.

A14.1 FortisBC calculates the three year historical average to be $0.509 million. The increase in forecast 2010 and 2011 expenditures is related to adjustments for inflation and changes in overhead loadings.

Please also see the response to BCUC IR No. 2 Q4.2 above.

Q14.2 Explain the under run in F2008.

A14.2 Right-of-Way Reclamation is typically undertaken upon identification of the need hence actual expenditures may vary compared to forecast.

Q14.2.1 Was this amount of $294,000 ever deducted in future applications?

A14.2.1 FortisBC assumes the amount referenced in Q14.2.1 should read "$266,000" as this was the variance between forecast and actual expenditures for 2008.

There was no need to make a deduction in future revenue requirements applications as only the actual expenditures were added to the rate base upon which customer rates are set.

Any deduction to future capital expenditure applications would be inherent as the forecasts provided are based on the actual expenditures.

15.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1, A22.5 and A 22.6
Distribution Sustaining Programs and Projects - Distribution Pine Beetle Kill Hazard Tree Removal
Exhibit B-4, BCUC IR 1, A45.1.5, p. 103
Summary Project Report for Growth and Sustaining Capital Transmission and Distribution

Commission staff note that FortisBC added $1 million to the to the distribution pine beetle program without Commission approval in Order G-11-09.

Previously, Transmission Pine Beetle Hazard Allocation was $1.218 million in F2009 and $0.821 million in F2010 for a total of $2 million.

In the F2011 Application:

Table 3.7
Transmission Pine Beetle Kill Hazard Tree Removal

Year	2009	2010	2011
Cost ($000s)	218	821	242

Previously, Distribution Pine Beetle Hazard Allocation was $0.722 million in F2009 and $0.551 in F2010 million for a total of $1.3 million.

In the F2011 Application:

Table 4.8
Distribution Pine Beetle Kill Hazard Tree Removal

Year	2009	2010	2011
Cost ($000s)	1,721	551	1,913

.

Q15.1 Provide the actual and forecasted amount for the Transmiision and Distribution Pine Beetle Hazard Tree Removal programs for

2009, 2010, and 2011.

A15.1 Please see Table BCUC IR2 A15.1 below.

Table BCUC IR2 A15.1

Year	Project	Forecast	Actual
		$000s	
2009	Distribution	722	1,721
2009	Transmission	1,218	218
2010	Distribution	551	1,000 *
2010	Transmission	821	371 *
2011	Distribution	1,913	1,913 *
2011	Transmission	242	242 *

* estimated values.

FortisBC explained the requirement to re-allocate expenditures between the Transmission and Distribution components of the Pine Beetle program in its response to BCUC IR No. 1 Q 22.6. Please also see the response to BCUC IR No. 2 Q15.3 below.

FortisBC states "It should also be noted that the expectation was that beetle infestation and activity would decrease. However, recent warmer winters have resulted in low beetle mortality and as a result beetle activity and associated infestations have increased within FortisBC service territory. British Columbia Ministry of Forests survey and research results indicate that current activity levels will continue for the foreseeable future and as a result 2011 spending is forecast to be higher than previous years."

Q15.2 Does the recent increase in forest fire activity reduce these expenditures? Please explain.

A15.2 Although forest fire activity would have a positive impact on beetle infestation and associated tree mortality the recent forest fire activity

was heavily concentrated to areas outside FortisBC's service area where there was heavy fuel loading caused from previously sustained Mountain Pine Beetle activity. As a result there was little or no impact on actual or forecast expenditures within FortisBC service territory.

Q15.3 Does FortisBC consider moving budgets between accounts having approved amount acceptable accounting practice?

A15.3 The actual expenditures were accounted for appropriately, and were charged to the correct accounts. The fact that budgets were prudently reallocated based on a needs-driven reprioritization is not related to accounting practices.

Q15.4 Provide further justification for the spending increase in F2011 as related specifically to the FortisBC Service Area.

A15.4 As noted in the response to BCUC IR No. 1 Q22.6, the increase in the 2011 expenditures for Distribution Pine Beetle Hazard Tree Removal is related both to the survey and research results from British Columbia Ministry of Forests, as well as the determination by the Company that the risk/exposure to the system more closely approximated to the ratio between the kilometres of distribution to transmission infrastructure, resulting in a prudent reallocation of 2009 and 2010 pine beetle hazard tree removal budgets. The expenditures forecast for 2011 represent a more consistent spend based on this reallocation.

Q15.5 Given that the British Columbia Ministry of Forests survey and research results indicate that current pine beetle activity will continue for the foreseeable future, it could be argued that the related tree removal activity is no longer considered an

extraordinary item and therefore this recurring activity should be considered an operating expense. Does FortisBC agree with this observation? Explain why or why not.

A15.5 No, FortisBC does not agree with this observation. According to the BC Ministry of Forests and Range[1], while on a Provincial scale the infestation peaked in 2005 the infestation is still on the rise in the Arrow, Okanagan, Boundary and Kootenay Lake areas. The infestation in the Arrow Pine Unit is expected to peak in 2012 and the Okanagan, Boundary and Kootenay Lake Pine Units are expected to peak in 2013. Approximately 65 per cent of the pine volume in the province is expected to be killed by 2016. The infestation will have largely subsided by that time and only an additional 2 per cent may be killed after 2020. From that report it is evident that the infestation is of a temporal nature and should be considered an extraordinary expenditure.

Furthermore, the recurrent or non-recurrent nature of an activity is not the sole determinant for capitalization. There is a long term benefit from this program, which has previously been approved as capital by the Commission.

[1] http://www.for.gov.bc.ca/hre/bcmpb/Year7.htm

16.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A23.2 Sustaining Projects – Small Planned Capital

Q16.1 FortisBC states that "future expenditures (are) based on historical averages." In support of this claim, does FortisBC agree that the 4-year historical average (2007-2010) for Distribution Small Planned Capital is $533,000 and therefore the 2011 forecast should be reduced to this average? Explain why or why not.

A16.1 No, the Company does not agree that the 4-year historical average for Small Planned Capital is $533,000. The calculation of $533,000 is based on various forecast values, and not on historical expenditures. FortisBC believes that the current method of basing the forecast on prior three year actual costs (2007 – 2009), adjusted for inflation and changes in overhead loadings, is the appropriate method because it is based entirely on known, not forecast, values.

Please also see the response to BCUC IR No. 2 Q4.2 above.

17.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1, A23.5, p. 50 Distribution Sustaining Programs and Projects - Small Planned Capital

Q17.1 Commission staff calculate the three year actual historical average as $0.702 million. Please confirm the calculation and justify the increase in F2010/11.

A17.1 FortisBC confirms the calculation. The increase in forecast 2010 and 2011 expenditures is related to adjustments for inflation and changes in overhead loadings.

Please also see the response to BCUC IR No. 2 Q4.2 above.

Q17.2 Explain the under runs in F2007/08.

A17.2 FortisBC notes that actual expenditures recorded for small planned capital in 2007/08 were over runs compared to the forecast. Small planned capital contains a number of discrete projects, the effort required to undertake detailed cost estimations for each would be significant compared to the value of the projects themselves. In addition, the exercise of scoping and engineering this type of work in advance would add significant costs to the projects themselves. For this reason actual expenditures may vary significantly compared to forecast. Additionally, the over run in 2007 is attributed to work carried over from 2005/2006.

18.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A24.4 Sustaining Projects – Forced Upgrade and Line Moves

Q18.1 FortisBC states that "future expenditures (are) based on historical averages." In support of this claim, does FortisBC agree that the 4-year historical average (2007-2010) for these activities is $1.321 million and therefore the 2011 forecast should be reduced to this average? Explain why or why not.

A18.1 No, the Company does not agree that the 4-year historical average for Forced Upgrade and Line Moves is $1.321 million. The calculation of $1.321 million is based on various forecast values, and not on historical expenditures. FortisBC believes that the current method of basing the forecast on prior three year actual costs (2007 – 2009), adjusted for inflation and changes in overhead loadings, is the appropriate method because it is based entirely on known, not forecast, values.

Please also see the response to BCUC IR No. 2 Q4.2.

19.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A26.3 Protection and Control Projects, pp. 46 - 50 Growth Projects – Kelowna 138 kV Loop Fibre Installation

Q19.1 Please explain if Option E provides looped path redundancy and to what stations.

A19.1 Option E would provide looped path redundancy for the inter-site communications between all substations in the Kelowna area.

Q19.2 Please discuss if this fibre will be underbuilt on existing FortisBC's lines, if not please discuss.

A19.2 Yes, as discussed on page 49 of the Application (Exhibit B-1), FortisBC intends to underbuild the fibre-optic cable on existing infrastructure. The majority of the cable will be attached to existing 138-kV transmission pole structures. For some limited sections, it will be necessary to attach the cable to FortisBC distribution poles.

20.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A28.2 Sustaining Projects – Lee to Vernon 230 kV Line Protection and Communication Upgrades

Q20.1 Please explain what is meant by the statement "none of these stations have transmission line protection" as Commission staff find it unlikely that a 138kV line would be in service with no protection.

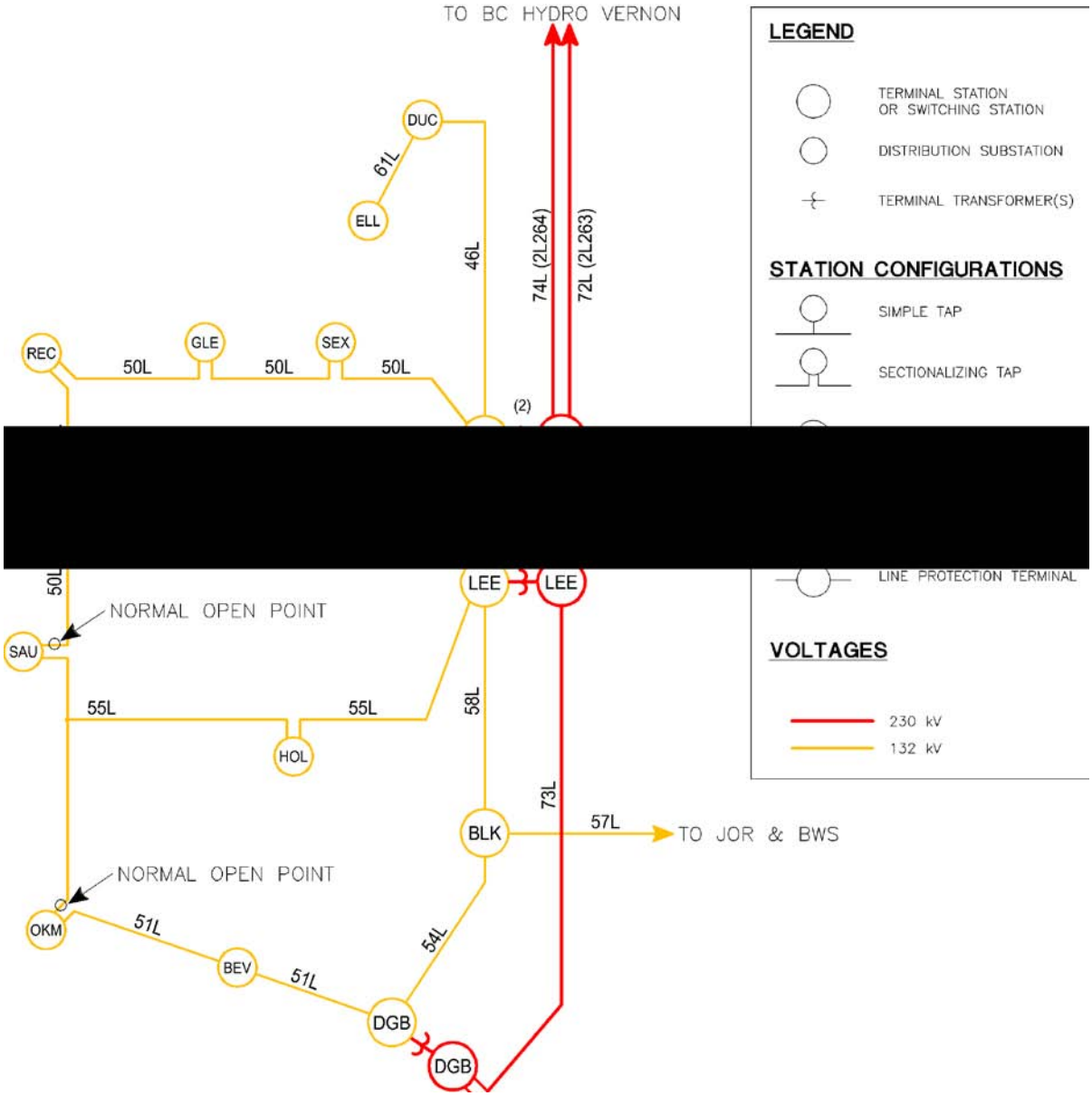
A20.1 The statement is accurate and refers to the fact that there is no transmission line protection equipment installed at the Kelowna-area legacy substations: Sexsmith (SEX), Glenmore (GLE), Recreation (REC), Saucier (SAU), Hollywood (HOL), and OK Mission (OKM). There are 138-kV circuit breakers at each of these stations; however, this equipment is used only for switching purposes and/or station transformer protection. There are no line protection relays installed on any of these circuit breakers. Protection for each of these transmission lines is provided by line protection relays which are installed only at the source terminals – either F.A. Lee (LEE) or D.G. Bell (DGB). As a result, the transmission lines which supply these stations must be operated radially at all times.

Following is the typical operating configuration of the Kelowna transmission network (refer also to BCUC IR No. 2 Figure A20.1 below):

- 50L energized from LEE and supplying the SEX, GLE and REC substations;
- 55L energized from LEE and supplying the HOL and SAU substations;
- 51L energized from the DGB and supplying the OKM Substation

as well as the soon to be completed Benvoulin Substation (BEV).

BCUC IR No. 2 Figure A20.1 – Kelowna Area Transmission System



A consequence of this method of operation means that all stations connected to a given line will experience an outage for a fault anywhere along the line section. For example, a fault at the end of 50 Line will result in an outage to all upstream substations (i.e. Sexsmith, Glenmore and Recreation).

The future meshing of the Kelowna transmission system would see the installation of line protection equipment at each of these six legacy substations. This would allow the current normally-open points to be closed, and each substation would then operate with two sources of supply in normal operations. This would have a positive impact on the SAIFI reliability statistic.

21.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A29.4 and A31.8
Vehicles

Q21.1 Since Transport Canada Motor Fleet Management Manual's recommendation for disposal of vehicles is between 4-8 years, please explain the large capital additions in vehicles in 2007 ($4.131 million).

A21.1 Included in the $4.1 million of expenditures in 2007 were carry-over costs of approximately $0.8 million for vehicles approved for purchase in 2006 but not delivered until 2007, and approximately $1.3 million associated with the buy-out or conversion of leased vehicles with owned vehicles as set out in FortisBC's 2006 Capital Expenditure Plan and approved by Order G-8-06.

22.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1, A29.4, p. 68
Mandatory reliability Standards Compliance
Table BCUC IR1 A29.4- Table 6.1 from Exhibit B-1
and Exhibit B-4, BCUC IR 1, A30.1, p. 71

Q22.1 Please explain the difference in the amounts in A30.1 of $2.399 million and A29.4 of $2.283 million.

A22.1 The $2.399 million provided in response to BCUC IR No. 1 Q30.1 was the initial estimate for spending on Mandatory Reliability Standards in 2010 as approved by Order G-162-09 concerning FortisBC's 2010 Revenue Requirements. The $2.283 million identified in 2011 Capital Plan and in the response to BCUC IR No. 1 Q29.4.4 is the current forecast, which includes $1.688 million in 2010 and $0.595 million in 2011.

23.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A30.2 Section 6 General Plant, p. 55 Mandatory reliability Standards Compliance

Q23.1 Please explain/describe what constitutes Critical Cyber Assets in the context of MRS compliance.

A23.1 Critical Cyber Assets are any technologies that are essential to the operation of a Critical Asset. Some examples are SCADA workstations, SCADA communications equipment and Remote Terminal Units (RTU).

24.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A33.2 Section 6 General Plant, pp. 58 and 64 Information Systems – Table 6.3 and 6.3(f)

Q24.1 Please define what is meant by "Information Systems" and what equipment is included in the project and how the "Information Systems" benefit from the SCADA enhancements if no field transducers are to be added.

A24.1 "Information Systems" are all the applications, data and infrastructure that are used to provide the back office technology requirements for FortisBC. This includes the corporate systems such as financial and billing systems, as well as the SCADA systems such as System Control workstations, substation and plant control computers, firewalls and all System Control applications. It also includes infrastructure and systems required to meet Mandatory Reliability Standards such as intrusion detection software and firewalls. It does not include control devices and equipment such as programmable logic controllers (PLC), RTUs or monitoring devices.

The addition of field transducers is included in Generation, Transmission and Stations, Distribution or Telecommunications/SCADA/Protection and Control projects. An example of one such project is the Distribution Substation Automation Program previously approved by Commission Order C-11-07.

Q24.2 Please discuss future plans to add enhanced monitoring systems to generating plants and substations and why these improvements are not considered in the project, or are they part of another project?

A24.2 These enhancements are specific to plant and substation equipment

and are addressed as part of the planning for that equipment. They require specific expertise and are not part of what is addressed for Information Systems project planning. These projects would be identified under the Generation, Transmission and Stations, Distribution or Telecommunications/SCADA/Protection and Control project categories.

25.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A37.1 Section 6 General Plant, p. 63 Information Systems - Customer Service Systems Enhancements– Table 6.3(e)

Q25.1 Is there a risk of these expenditures becoming a stranded investment if/when AMI is implemented?

A25.1 None of the Customer Service Systems proposed in the 2011 Capital Plan will be materially affected by the proposed AMI project, therefore there is no risk that these expenditures would become "stranded" due to implementation of AMI.

26.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A38.1 Section 6 General Plant, p. 63-64 Information Systems – SCADA Enhancements

Q26.1 In what budget is the infrastructure for Cascade data generation, transmission and storage captured?

A26.1 Capital budget requirements for the infrastructure that supports Cascade computerized maintenance management software (CMMS) is captured in the Infrastructure Upgrade project.

Q26.2 Repeat the above question for generating plants and substations data.

A26.2 These expenditures are also captured in the Infrastructure Upgrade project.

27.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A40.1 Telecommunications

Q27.1 Please explain the circumstances that would justify a 255% increase in the forecast for Telecommunications expenses in 2011 versus 2010.

A27.1 The increase is related to two specific projects:

1. Installation of a new VHF repeater site in Creston
    - This is a safety-driven project to improve the coverage of the Company-owned VHF radio system in the Creston area. FortisBC safety practices require that field crews have two methods of voice communication available at all times. Cell phone coverage is not available in this area and thus crews must rely on satellite phones and company VHF radios. The existing VHF coverage in the area is poor and will be greatly improved by the installation of a new mountain-top repeater site.
2. Replacement of the System Control Centre dispatch radio consoles
    - The existing consoles have run out of radio channels and are thus not capable of any further expansion. As well, the units are mid-1990s vintage and do not offer the functionality and improved user interface available in modern equipment.

28.0 Reference: Exhibit B-1, Section 6 General Plant, p. 67
Building Projects – Emergency Building Upgrades

Q28.1 In the last Capital Plan, FortisBC forecasted $88,000 and $89,000 for facility emergency requirements. Please provide the actual costs in this category for 2009 and 2010.

A28.1 The actual costs were $90,000 for 2009. The Company is forecasting expenditures of $90,000 for 2010.

Q28.2 What is the treatment of the variances from the approved budget in this category? Please explain.

A28.2 Emergency projects that are not covered by the budgeted amount would result in review of the capital budget to determine whether other projects could be deferred.

29.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A42.1-A42.8 Long Term Facilities Solutions

Q29.1 Does FortisBC plan to file a CPCN application(s) regarding the Kootenay and Kelowna Operation Centre projects? If not, why not?

A29.1 As FortisBC is requesting funding to determine the appropriate and cost-effective long-term solutions for the Kootenay and Kelowna Operations Centres, it is not known at this time what form the requests for approval will take. If one or both of the projects meets FortisBC's CPCN application criteria, which in their present form are set out at pages 8 and 9 of the 2011 Capital Plan application, the Company will file CPCN applications as appropriate.

Q29.2 Please confirm that FortisBC will be able to avoid the leasing costs of the Enterprise Site ($571,000) with the construction of the Kootenay Operations Centre?

A29.2 FortisBC will be able to avoid the leasing costs of the Enterprise Site ($571,000) with the construction of the Kelowna Operations Centre.

30.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 53.1 and 52.1 and Exhibit B-1, Appendix 3, Tables 2.2.2, 2.2.4, 2.2.6 and Ex. B-1-2, Table 7.1
Program Achievable Potential

Table BCUC IR1 A53.1a

Program Achievable Potential, (Excluding fuel switching, behavioural measures, and customer-owned renewable)					
	2011	2015	2020	2025	2030
	GWh				
Residential	19	94	192	281	369
Commercial	10	53	107	142	177
Industrial	1	8	18	23	28
Irrigation	1	3	5	8	11
Total	30	158	322	453	585

Table BCUC IR1 A53.1b

Behavioural, Customer-Owned Renewable & Fuel Switching Potential (Unbundled)					
	2011	2015	2020	2025	2030
	GWh				
Behavioural	0.1	2.5	15.2	29.4	43.5
Fuel Switching	0.4	2.2	4.5	6.7	9.0
Customer Owned Renewable	0.5	6.6	22.8	75.0	191.1

Table 7.1
2011 Demand Side Management Plan

	Sector/Component	Savings	Cost	TRC
2		MWh	($000s)	Benefit/Cost
3	Residential	16,422	3,636	1.8
4	General Service	13,940	2,118	2.8
5	Industrial	9,360	613	4.8
6	**Subtotal Programs**	**39,722**	**6,367**	**2.5**
7	Supporting Initiatives		725	
8	Planning and Evaluation		750	
9	**Total**	**39,722**	**7,842**	**2.3**
10	Income Tax Impact		(2,078)	
11	**Total (Net of Tax)**		**5,764**	

Q30.1 In FortisBC's response to BCUC IR 52.1, it estimates expected savings of 39.7 GWh resulting from the 2011 DSM Plan. Please reconcile this estimate with Table BCUC IR1 A53.1a which estimates 30 GWh program achievable potential for 2011.

A30.1 Please see the response to BCUC IR No. 1 Q103.1.

Q30.1.1 Table 7.1 forecasts FortisBC will achieve greater savings than the 2011 Program Achievable Potentials

in Table BCUC IR1 A53.1a for the Commercial/General Service (139%) and Industrial (936%) classes and less than the Program Achievable Potential for the Residential Customer class (86%). Please explain these forecasts and specify which programs in the 2011 DSM Plan are responsible for these estimates. Please explain in detail how FortisBC plans to achieve 936% of the Industrial class Achievable Potential.

A30.1.1 FortisBC is currently working on large projects with some of its large industrial customers, and expects the related costs and savings to be realized in 2011. Based on its recent experience in the commercial sector, FortisBC also expects to exceed the commercial savings identified in the CDPR. Please also see the response to BCUC IR No. 1 Q103.1.

Q30.2 What assumptions did FortisBC use to estimate Behavioural Potential increasing from 0.1 GWh in 2011 to 43.5 GWh in 2030 in Table BCUC IR1 A53.1b?

A30.2 The behavioural potential estimates are based on the approach and measure data developed by BC Hydro as part of the Conservation Potential Review initiated in 2006. The individual measure savings are based on a percent savings by end use. The FortisBC-specific end-use data were used and the BC Hydro percent savings values were applied to obtain measure savings appropriate for FortisBC. The total 20-year, unbundled estimate was derived, and then the "emerging technology" ramp rate was applied to distribute the savings on an annual basis over this time period. The emerging

technology ramp rate assumes very low penetration rates in early years while the program is developing and strengthening as time proceeds through the 20 years.

Q30.2.1 What research does FortisBC have to support this estimate?

A30.2.1 FortisBC relied upon the research undertaken for the BC Hydro 2007 Conservation Potential Review (CPR) for the approach and measure data. (Exhibit B-1-1, Appendix D to Appendix 3, pp. 120-125). Please also see the response to BCUC IR No. 2 Q30.2 above.

Q30.3 FortisBC states "[Customer Owned Renewable] should continue to be viewed as 'Technical' potential until they become cost-effective (IR Response 53.1). Given this statement, how does FortisBC estimate it can achieve 0.5 GWh potential savings from Customer Owned Renewable in 2011?

A30.3 Table BCUC IR1 A53.1b identifies the total Technical Customer Owned Renewable (COR) potential of 0.5 GWh and the sole measure contained in 2011 DSM Plan is residential solar hot water totalling 0.14 GWh. Please also see the response to BCOAPO IR No. 1 Q38.2.

Q30.4 In Exhibit B-1, Appendix 3, the difference in forecast energy use and forecast energy use with potential savings in 2030 is 786 GWh for Residential customers (Table 2.2.2), 235 GWh for Commercial Customers (Table 2.2.4) and 28 GWh for Industrial Customers (Table 2.2.6). Please explain why the Residential and Commercial differences in Exhibit B-1 are different from the Program Achievable Potentials in Table BCUC IR1 A53.1a.

A30.4 Tables 2.2.2 through 2.2.6 (Appendix 3, Exhibit B-1) present the Technical Potential in graphic form (bar charts), which included behavioural, fuel switching and COR savings estimates, that were prepared for and exhibited as part of the public consultation process in March 2010. Table BCUC IR1 A53.1a is the portion of Technical Potential identified in the final June 2010 report as Program Achievable Potential.

31.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 55.1 and IR1 57.1
Low Income/Rental Programs

FortisBC states "The Energy-Saving Kit (ESK) offer is made available to Residential Low-Income Households, Rental Accommodation (Single and Multi-Family), and First Nations Residential Households. The ESK program only started in 2010, so there is no historical information available." (IR 55.1)

Table BCUC IR1 A57.1 cont'd

Program	Offer/ Campaign	Marketing Tactics/Channels	Collateral
Low Income/Rental	Free Product • Energy Saving Kits • CFLs • Clotheslines Rental Pilot Project	Direct Mail • Service organizations • Housing associations Public Relations Personal Contact • Service organizations • Housing associations • Health and Wellness trade shows • Food banks Public Relations	• Application forms • Letters • Posters • Website • Brochures • Media release/earned media • Powerlines newsletters

Q31.1 Please confirm that Free Product (ESKs, CFLs, Clotheslines) and Rental Pilot Project is a complete list of programs offered for Low-Income, Rental and First Nations Households.

A31.1 Not confirmed. In addition to the Free Products and Rental Pilot mentioned, the Company will offer a light retrofit program, consisting of an audit and select weatherization measures such as insulation and draftproofing, to eligible Low-Income, Rental and First Nations households. As well, low income customers can benefit from the clothesline program available to all residential customers.

Q31.2 Please provide details of the Rental Pilot Program.

A31.2 The intent of the project is to combine community-based communication strategies and tactics to influence renter behaviour change in combination with financial incentives for the landlord to

make energy efficiency improvements to the rental units themselves. A 64-unit low-cost rental property has been selected for the test. A resident in the property, with strong low-income advocacy skills, is leading the internal resident component and PowerSense staff has had preliminary discussions with the landlord. It is expected that details of the project will be completed by mid-October 2010, with implementation to begin shortly thereafter.

Q31.3 For each of the Low Income/Rental Programs provide a table showing forecasts of the following:

Program	Savings (MWh)	Cost ($000s)	TRC	Status	Net Load (GWh)	Potential (GWh)	Savings (Percent)

A31.3 The 2011 DSM Plan includes the following components for Low Income/Rental programs as detailed in Table BCUC IR2 A31.3 below.

Table BCUC IR2 A31.3

Measures	Energy Savings (MWh)	Utility Cost ($000s)	TRC	Status	Net Load (GWh)	Potential (GWh)	Savings (%)
ESK	335	$84	2.4	Enhanced	n/a	n/a	n/a
Light retrofit	206	$221	1.1	New	n/a	n/a	n/a
CFLs	350	$40	2.7	Continuing	n/a	n/a	n/a
Clotheslines[1]	92	$15[1]	12	Continuing	n/a	n/a	n/a

[1] – This is 10 per cent of the clothesline budget and savings, the balance is attributed to the general population.

32.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 55.1 and Exhibit B-1-2, Table 7.1, p. 72 Irrigation Programs

Table BCUC IR1 A55.1

Program	Savings (MWh)	Cost ($000s)	TRC	Status	Net Load (GWh)	Potential (GWh)	Savings (Per cent)
Irrigation Hi/Med to Low Press pivot Pump Nozzle/Gasket Hi-efficiency motors	580	$40	7.1	new	50.0	10.8	5.4%

Table 7.1
2011 Demand Side Management Plan

	Sector/Component	Savings	Cost	TRC
		MWh	($000s)	Benefit/Cost
	Residential	16,422	3,636	1.8
	General Service	13,940	2,118	2.8
	Industrial	9,360	613	4.8
	Subtotal Programs	**39,722**	**6,367**	**2.5**
	Supporting Initiatives		725	
	Planning and Evaluation		750	
	Total	**39,722**	**7,842**	**2.3**
	Income Tax Impact		(2,078)	
	Total (Net of Tax)		**5,764**	

Q32.1 Did FortisBC operate DSM program(s) for the Irrigation customer class in 2010?

A32.1 Yes, FortisBC operated an Irrigation DSM program as part of the Building and Process Improvement (BIP) program, which is included in General Service.

Q32.2 Where in Table 7.1 are the Savings and Cost of the new Irrigation Program included? If they are not, please provide an update version of Table 7.1.

A32.2 The Irrigation program is included in the General Service sector in Table 7.1. Please see Table BCUC IR2 A32.2 below which provides the requested update to Table 7.1 of the Application.

Table BCUC IR2 A32.2

	Sector/Component	Savings (MWh)	Cost ($000s)	TRC (B/C ratio)
4a	General Service	13,360	$2,078	4.3
4b	Irrigation	580	$40	7.1

33.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 55.2 TRC Calculations

Q33.1 From where did FortisBC source the Unit Measure Savings (kWh) for each of the measures?

A33.1 The Unit Measure Savings (kWh) for each measure were obtained from one of the three following sources: 1) the 2007 BC Hydro Conservation Potential Review, 2) the Northwest Power and Conservation Council's 6th Power Plan, and 3) Ontario Power Authority energy efficiency measure databases.

Please also see the response to BCOAPO IR No. 1 Q24.1.

Q33.2 What specific costs were included in the Unit Cost calculation?

A33.2 Unit costs are, for the most part, the measure costs – incremental cost for new construction and full cost for retrofit. In a limited number of measures the present value of O&M costs are incorporated, where there is a change compared to the baseline technology.

Q33.2.1 Were free rider and spillover rates estimated and netted out of any of the costs included in the Unit Cost calculation? If so, at what levels and how were they estimated?

A33.2.1 Free rider and spillover rates were not netted from the benefits in the Unit Cost calculations since the results are used for planning and load forecasting purposes.

Q33.3 From where did FortisBC source the Estimated Measure Life (EML) for each measure?

A33.3 The Estimated Measure Life (EML) for each measure was obtained from one of the three following sources: 1) the 2007 BC Hydro Conservation Potential Review, 2) the Northwest Power and

Conservation Council's 6th Power Plan, and 3) Ontario Power Authority energy efficiency measure databases.

Q33.4 What specific benefits were included in the Unit Benefit calculation? Were adders such as non-energy benefits included? If so, which ones and how were they determined?

A33.4 The benefits included in the Unit Benefit calculation are Energy Savings benefits, and non-energy benefits. Non-energy benefits were included for select measures where these benefits could be quantified. Residential non-energy benefits are primarily water savings benefits included in the following measures: Energy Star Dishwasher, Energy Star Clothes Washer, Efficient Showerheads, and Faucet Aerators. The benefit values were obtained from the same three sources as measure savings, costs, and life values. The methodology for determining non-energy savings may differ among sources. In the case of residential showerheads, water savings is valued according to a weighted average of water and sewer rates for water supply and treatment (measured in $/1000 gallons) by population and city. Water savings is calculated according to the baseline saturation level of 2.0 GPM showerhead and average use.

Q33.5 How were the Number of units determined for each measure? Do the Number of Units figures include an increase over the Number of Units estimated in past years? If so, how was the precise increase determined?

A33.5 Estimating the number of units for each measure is the basis for the potential estimation process. Please refer also to the "Methodology" section of the CDPR. In brief, the residential and commercial survey data were utilized to determine the building stock and saturations of energy efficiency measures. This information is used to estimate the

number of energy efficiency measures (units) that could be installed. The general equation for a residential measure is:

Measure Savings = (Per Unit Savings) x (# of households) x (Applicability) x (1- Saturation)

The number of units is (# of households) x (Applicability) x (1-Saturation). The "Applicability" value is highly dependent on the measure and the housing stock. For example, a heat pump measure is applicable to single family homes with electric space heating equipment. Growth rates are applied to housing and building stock to determine potential in new construction. Measures that have already been installed are accounted for in the saturation value.

Q33.6 Does Table BCUC IR1 A55.2 show all programs and measures FortisBC plans to implement in its 2011 DSM Plan?

A33.6 Confirmed.

Q33.6.1 Table BCUC IR1 A55.2 shows TRC benefit to cost ratios below 1. Does FortisBC plan to implement these programs? For example, under Residential New Home program two measures are shown: Whole House EG80, TRC 1.8 and Whole House EG90, TRC 0.6. Does FortisBC plan to implement both of these programs? For the non-mandatory measures with a TRC below 1 that FortisBC plans to implement, please provide justification.

A33.6.1 Yes, both program measures will be implemented. DSM measures with a TRC below 1 are justified under the UCA s. 44.2(5)(a) referencing the CEA Part 1 s. 2(d) (the "innovative technologies" provision).

As well, the Commission may determine cost-

effectiveness on a portfolio basis rather than an individual basis, pursuant to the Demand Side Measures Regulation 326/2008 s. 4(1).

34.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 A55.3.1 Section 3.2, pp. 21-23 Demand Side Management Plan Overview, Table BCUC IR1 A55.3.1

Q34.1 How does Fortis BC measure the "Actual GW.h Savings", or is it actually only estimated?

A34.1 FortisBC cannot measure "Actual GWh savings", but provides an estimate based on the actual measures installed.

35.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 57.1 and Exhibit B-1-2, Table 7.2 Residential Programs

Q35.1 Table BCUC IR1 A57.1 lists studies for Offer/Campaign for the New Home – Single Family and Multi-Family (New & Retrofit) programs. Please explain what is meant by the term studies.

Table 7.2
Residential Programs

	Savings	Cost	TRC	Status
	MWh	($000s)	Benefit/Cost	
Building Envelope	5,460	1,379	1.7	Enhanced
Heat Pumps	3,397	694	1.4	Enhanced
Lighting	3,420	438	2.4	Enhanced
New Home	105	54	1.4	Enhanced
Appliances	680	245	3.0	New
Electronics	180	49	4.8	New
Water heating	960	162	2.1	New
Low Income	540	305	3.0	Enhanced
Behavioural	1,680	310	6.8	Enhanced
Total	**16,422**	**3,636**	**1.9**	

A35.1 The term studies refers to engineering studies that are commissioned to determine the base line electrical use for standard buildings (multi-unit single-family home and multi-family developments) and the electrical savings that could be realized if energy efficient measures are incorporated into the design.

Q35.2 Table BCUC IR1 A57.1 lists the following programs: Retrofit – Single Family; Multi-Family (New & Retrofit); Laundry; Solar Water Heating; and Conservation Culture. Please indicate in which Category in Updated Table 7.2 each of these programs is included.

A35.2 Retrofit – Single Family and Multi-Family (New and Retrofit) are included under Building Envelope. Laundry is included under Appliances, and Solar Water Heating is included under Water

Heating. Conservation Culture is funded under Supporting Initiatives, not Residential Programs.

36.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 57.2 Residential Programs

Table BCUC IR1 A57.2

Program Name	2010 Incentive (¢/kWh)	2011 Incentive (¢/kWh)
Building Envelope	24.3	20.5
Heat Pumps	5.3	15.7
Lighting	4.5	8.1
New Home	13.9	46.7
Appliances	No program	31.3
Water Heating	30.9 (Solar only)	12.1
Low Income	10.0	35.8

Q36.1 How do residential customers access the incentive rebates? Are they instant rebates, mail-in, or other? For each program, please indicate how customers access the incentive. Please also include the programs listed in Table BCUC IR1 A57.1.

A36.1 Please see Table BCUC IR2 A36.1 below.

1 **Table BCUC IR2 A36.1**

Program Name	Types of Incentives
Building Envelope	• LiveSmart BC and ecoEnergy partnership: mail-in rebate • Single and Multi-Family Retro-Fit: mail-in or on-line rebate
Heat Pumps	• LiveSmart BC and ecoEnergy partnership: mail-in rebate • Single and Multi-Family New Home program: mail-in or on-line rebate • Single and Multi-Family Retro-Fit program: mail-in or on-line rebate
Lighting	• Single and Multi-Family New Home program: mail-in or on-line rebate • Retail Point-of-Sale - instant rebate from retailer • Retail coupon: mail-in rebate with credit to electrical account
New Home	• Single and Multi-Family New Home program: mail-in or on-line rebate
Appliances	• Mail-in or on-line rebate with credit to electrical account
Electronics	• No rebate; incentive provided to retailer
Water heating	• SolarBC partnership: mail-in rebate • Heat pump hot water: mail-in or on-line rebate
Low-Income	• Mail-in or on-line application • Group application/agreement (personal communication)
Behavioural	• No rebates

37.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 57.2.1 Incentive Levels

FortisBC states "However, basic economic demand theory states that decreasing the price of a good will increase the quantity demanded. Please also refer to the Northwest Power and Conservation Council's white paper on achievability for an example of a study that evaluates achievement when incentives are equal to 100 per cent of the incremental measure cost (provided as Appendix BCUC IR1 A57.2.1)".

Q37.1 Does FortisBC have other research or literature supporting the premise that increased incentive levels increase uptake of DSM programs? If so, please provide.

A37.1 The attached paper (Gilberto De M. Jannuzzi and Vanice F. Dos Santos, "The Costs and Benefits of Residential Lighting Programs in Brazil" [BCUC IR2 Attachment A37.1]) provides empirical evidence of the effect of incentive levels on a nascent energy efficiency market – in this case compact fluorescent light bulbs. The paper concludes that "… with higher rebate, more lamps are sold per day, and the number of lamps sold per household and the total savings increased."

3rd European Conference on Energy-Efficient Lighting

IMPLEMENTATION

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THE COSTS AND BENEFITS OF RESIDENTIAL LIGHTING PROGRAMS IN BRAZIL

ABSTRACT

This article presents results of the first utility sponsored residential lighting rebate programs in Brazil. The costs of conserving electricity via this type of program as well as the impact on CFL sales resulting from different rebate levels are presented. The programs were held in three cities of the State of São Paulo and followed the same structure: the same information campaign, lamp products, number and type of vendors, and participation conditions. The results show with higher rebate more lamps are sold per day, and the number of lamps sold per household and the total savings achieved increase. It was also noticed that the most affluent consumers have higher participation levels, and this apply to all rebate levels tested. In the present analysis rebates costs, administrative costs and all other program costs were included. The results show that the utility program was cost-effective at three rebate levels tested.

INTRODUCTION

Utilities and government agencies are becoming increasingly aware of the need to promote energy conservation in the various consumer classes in Brazil. In 1994 total electricity consumption was about 240 TWh, 23% used by the residential sector. About 16-17% of total electricity is used for lighting, and about 4% of total electricity accounts for residential lighting. Very recently there has been some effort in some Brazilian utilities to invest in efficiency and DSM programs in the residential sector in order to restrain the continuing increase of evening peak demand (Jannuzzi 1994a). Although program evaluation and the use of financial incentives to promote conservation is being practiced in many utilities and government agencies in some countries (Eto *et al* 1994, Hirst 1994), those are entire new activities in Brazil.

Domestic lighting is one of the most important end-users during peak periods, and previous work (Jannuzzi, G. 1994b) has indicated the cost effectiveness for utilities to promote lamp replacement programs using rebates in Brazil. Nevertheless, until very recently there was great scepticism in the Brazilian energy sector about giving financial incentives to residential consumers, and whether this would be cost-effective. As programs get bigger in size, utilities become more demanding with regards to the economic returns of the capital invested and subsequently are more interested in analyzing the changes being made in their consumer market, hence evaluation becomes an important activity.

In this paper we present only the cost-benefit evaluation from the utility's perspective. Future work will also analyze the results from the consumer and societal perspectives.

This work is based on initial findings of lamp rebate programs performed in three cities of the State of São Paulo, namely Americana, Franca and Marília. We discuss the implications of rebate levels in the program cost-benefit analysis.

PROGRAM METHODS AND LAMP PRODUCTS

Eligible residential customers in the three cities were subjected to the same information campaign four weeks before the start of the program in each city. The information dissemination also continued during the program in each city. Customers received rebate coupons by post one week before the lamp sales. The program had a choice of 13 different types of lamps suitable for replacement of the regular 60 W and 100 W incandescents. In each city one supermarket and one retail seller were chosen as places for the customers have their rebate coupons redeemed. In each city the largest supermarket the most traditional lighting store were chosen. The lamp products available and their prices are displayed in Table 1. For each city the coupon received by the customer had a percentage value indicating the rebate level offered for all lamp products. Each city had a different rebate level: Americana 30%, Marília 60% and Franca 70%.

It was decided as part of the program that the utility would limit the sales of CFLs to 10,000 for each city and that each customer could buy up to 3 lamps. The number of lamp types and prices were decided by the utility and the three lamp manufacturers involved in the programs.

Table 1. Main characteristics of lamps used in the rebate programs

	Watts	*ballast type*	*wattage replaced*	*US $*
1	15	electronic	60	38.89
2	18	electromagnetic	60	22.04
3	20	electronic	100	41.49
4	27	electromagnetic	100	16.40
5	19	electronic	60	29.84
6	22	electronic	60	29.84
7	25	electromagnetic	60	16.06
8	22	electronic	100	29.84
9	27	electronic	100	33.70
10	32	electronic	100	35.00
11	15	electronic	60	35.65
12	18	electromagnetic	60	18.13
13	23	electronic	100	35.65

note: Watts listed include losses in the ballast. Rebates were applied to the prices presented. Exchange rate used: US $ 1,00 = R $ 0,82 (jan./95).

PROGRAM RESULTS AND EVALUATION

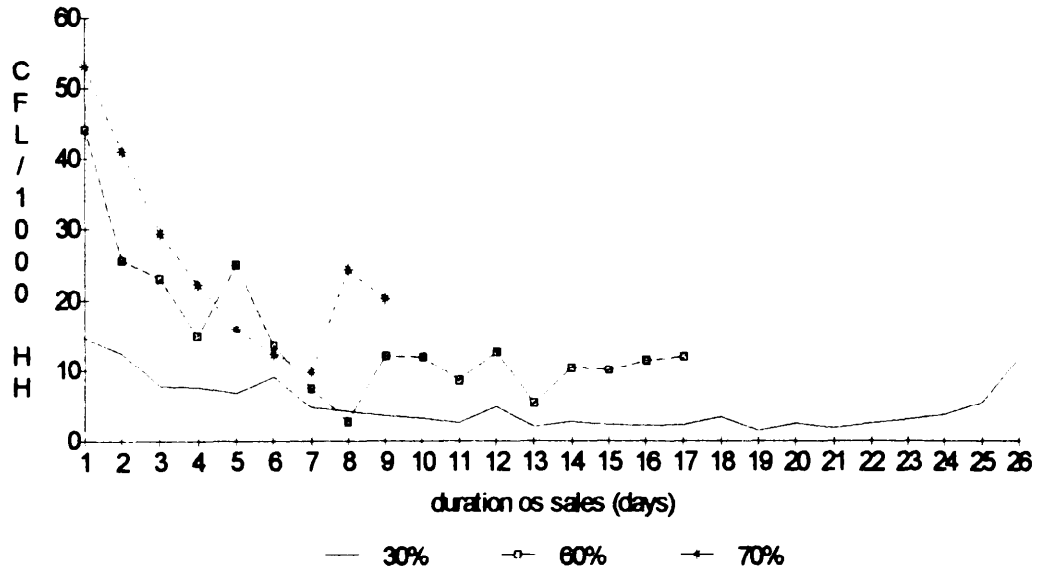
Rebate levels seem to affect strongly the initial response of sales as is indicated in Figure 1. It is also interesting to note that the first days of the programs attracted many customers and that lamp sales decreased sharply afterwards, regardless of rebate level.

The duration of the campaign was one month (maximum) or up to the sale of 10,000 lamps, which explains the low participation rates registered. The rebate level indicated an increasing response in the velocity of sales, i.e. more lamps are sold on a daily basis. At the 30% rebate after 26 days the program sales stagnated reaching the number of only a 5700 lamps, at the 60% level, 11,000 lamps were sold in 17 days[1]. At the 70% 10,050 lamps were sold in 9 days.As Figure 1 also indicates each time the rebate level increased the initial number of lamps was also greater.

[1] In one of the cities more than 10,000 lamps were sold due to problems in accounting for the lamps during the last days.

Rebate levels also affected the number of lamps bought per household. At the 70% subsidy level the limit almost of 3 lamps per customer was attained. We observe also a change in the mix of products bought towards more expensive (and more efficient) lamps. At the three subsidy levels the two most preferred lamp types were the cheapest electromagnetic CFLs available: one to replace a 60 W incandescent and the other to replace a 100 W. This indicates the influence of the price of the technology on the consumers' choice.

Figure 1 : The daily evolution of lamp sales and rebate levels
(CFLs sold per day per 1,000 households).



higher rebate levels show a strong response in CFLs sales per day, especially during the initial days of the program. CFL sales terminated when the total of 10,000 units were sold in each city.

Table 2. Programs response at different rebate levels

	30%	*60%*	*70%*
duration until 10,000 lamps sold (days)	26	17	9
lamps sold	5700	11050	10058
eligible households (1,000)	44,4	44,1	65,3
participating households	5%	9%	5%
number lamps/household	2,5	2,8	2,9
total purchase cost (with rebate) US$/HH	46,6	30,28	22,9
total purchase cost (without rebate) US$/HH	66,55	75,69	76,33
avg. CFL wattage	24,09	23,74	23,38
avg. wattage of incand. replaced	78,69	73,62	77,13
average price per lamp (without rebate) US$	25,64	27,1	26,45

note: Americana (30% rebate), Marília (60% rebate) and Franca (70% rebate).

The amount of annual energy savings achieved in each city are displayed in Table 3 together with the avoided peak capacity.

Table 3. Estimated Program Annual Savings (MWh and kW peak)

	30%	*60%*	*70%*
MWh	341	605	592
kW	202	359	351

note: assuming 3 hours of lamp usage and 65% peak coincidence.

From the utility's perspective all programs are cost-effective, even at the high rebate level of 70%. We have computed the costs of rebates, program administration, information campaign and variable costs in order to assess the cost of saved electricity. Direct cost includes only utility expenses with rebates, and total cost include all expenses incurred with the program implementation. Table 4 shows the program results at the three rebate levels. Total program cost per saved kWh become closer to direct costs at higher rebate levels due to the larger number of lamps (and savings) achieved at those levels. As can be seen the cost of conserved electricity (cce) for each rebate level is lower than the marginal electricity process to supply the residential customer[2]. At higher rebate levels total program costs approach the value of the average residential tariff.

Table 4. Cost of Conserved Electricity for Lighting according to Rebate Levels (US $/kWh)

	30%	*60%*	*70%*
CCE (direct)*	0,02	0,05	0,06
CCE (total)*	0,05	0,07	0,07
marg. cost	0,16	0,16	0,16
avg. tariff	0,08	0,07	0,07

notes: Marginal cost is the marginal cost of supplying electricity for residential lighting purposes. (*) A 12% discount rate was used for these evaluations, which is compatible with the discount rate used by the utility. The most expensive residential electrical tariff is US$ 0,09/kWh.

If we consider the utility's revenue losses the programs also show benefits even at a 70% subsidy level. The average net annual benefits achieved per lamp sold (including rebate and program administration costs) are $2.22 for the program with the 30% rebate level and $1.48 at the 70% level (Table 5). These favourable indicators result mainly from the existing gap between the marginal costs to supply electricity for lighting in the residential sector and the average tariff. Revenue losses are different for each city due to the differing structure of the residential market. Americana has a higher participation of customers paying higher tariffs, and has a higher average tariff as shown in Table 4.

Table 5. Program Net Annual Benefits and Rebate Levels (US $/lamp replaced)

	30%	*60%*	*70%*
direct costs	$3,42	$2,05	$2,02
total costs	$2,02	$1,35	$1,28

notes: these figures reflect the utility's revenues losses, program costs (direct and total) and gains with avoided electricity production for each incandescent replaced by a CFL. Direct costs include only the rebate and total costs include also program administration, information campaign and other expenses.

Also, it was noted that the great majority of customers did not have previous knowledge of compact fluorescent lamps before the program (Table 6).

Table 6 : Some indicators from the Program Information Campaign

	Americana (30%)	*Marília (60%)*	*Franca (70%)*
had no previous knowledge about CFLs before the programme	71%	80%	77%

We also evaluated the effect of having limited the number of CFLs selling places to only two outlets. In the three cases most customers went to the selling point to purchase the lamps and there is no indication that this limited or offered an additional barrier to the program sales.

[2] We estimate the average marginal electricity price to supply the lighting energy requirements for residential household in US $ 0.163 per kWh (this figure takes into account the lighting load profile and peak and off-peak marginal prices).

DISCUSSION

The results from these programs indicate that financial incentives such as rebates are an essential component in CFLs programs, and this type of program is cost effective to utilities. It was also observed that information campaigns presenting the new technologies are also important to educate the residential customer.

The number of participating households could have increased if more lamps were available in the programs with high rebate levels, but it was also noted that most lamps are concentrated amongst households that have high levels of electricity consumption, and hence, higher income households. This fact is being further analyzed and will give insights with respect to the upper limits of participation levels that can be achieved in the Brazilian context. Also, due to the block tariff structure (electricity tariffs increase with consumption levels), the cost-benefit of the program is likely to change when we consider tariffs, penetration rates and lamp characteristics by consumption class. This is relevant when considering the Utility's evaluation perspective, since revenue losses are greater amongst high electricity consumers.

The results indicate that rebates are necessary in order to successfully introduce CFLs into the residential market. It seems that rebate levels between 30 and 60% rebate level may be sufficient to attract consumers and achieve satisfactory benefits to the utility.

This experiment has attracted interest from other utilities in Brazil and also from the National Electricity Conservation Program, which is considering financing its expansion to larger regions of the country.

ACKNOWLEDGMENTS

The results presented in this paper are part of the program evaluation being performed by the authors and is being sponsored by the São Paulo Light and Power Company. We would like to acknowledge the participation of Prof. C.Y. Wada and L.B. Camarena from the University of Campinas for all the sampling and primary statistical work performed. We also thank Mr. M.M. Campos and Mr. K.J. Fugiwara from São Paulo Light and Power Co. who were responsible for conducting the experiment.

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38.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 61.1 and Exhibit B-1-2, Table 7.3 General Service Programs

Q38.1 Table BCUC IR1 A61.1 lists the following programs: Product Option (fixed rebate); Partnership in Efficiency (PiE); Small Business Lighting Evaluations. Please indicate in which Category in Updated Table 7.3 each of these programs is included.

Table 7.3
General Service Programs

	Savings	Cost	TRC	Status
	MWh	($000s)	Benefit/Cost	
Lighting	7,130	1,080	2.4	Enhanced
Street Lighting				New
Building Improvement	3,010	572	2.8	Enhanced
Weatherization				
Building envelope				
Refrigeration				
HVAC				
Pumps and fans				
Compressed air				
Computers	240	34	2.6	Enhanced
Servers/Networks				New
Municipal	3,560	432	4.0	Enhanced
Wastewater				
Irrigation				
Total	**13,940**	**2,118**	**2.8**	

A38.1 The Small Business Lighting evaluations fall under the General Service Lighting program. Product Option is not a program, but is a type of incentive structure for any program with standardized measures. For example, a heat pump incentive can be provided on a rebate per ton of heating/cooling capacity basis.

Partnership in Efficiency (PiE) is a high-level Memorandum of Understanding (MOU) between FortisBC and large general service customers, such as municipalities. Under the MOU, a number of energy efficiency projects may be brought forward and incented

under various programs such as street lighting, municipal wastewater and building and process improvements.

39.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 64.1 General Service Programs – Computers – Data Centre and Server Program

FortisBC states "BC Hydro has a number of similar programs, as reportedly do some US utilities. FortisBC is not aware of the level of savings those programs have achieved."

Q39.1 Will FortisBC follow the BC Hydro model or model from other US utilities for its Computer – Data Centre and Server Program? If not, what processes, best practices or lessons learned from other utilities is FortisBC using to plan its Computer program?

A39.1 FortisBC has had a number of discussions with BC Hydro PowerSmart to ascertain their method of treating such projects. In addition FortisBC has retained a consultant to determine the baseline energy usage of Data Centres. Each project will be handled on an individual basis.

40.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 66.1.1 Industrial Sector Programs

FortisBC states "The technology to provide Integrated Building Optimization is relatively new; however, a number of utilities have introduced programs within the last two years, including BC Hydro, Manitoba Hydro and NStar (Massachusetts). The programs have achieved an average of 8 per cent electrical and 20 per cent gas savings."

Q40.1 Will FortisBC follow the BC Hydro, Manitoba Hydro or NStar models? If not, what processes, best practices or lessons learned from other utilities is FortisBC using to plan its Integrated Building Optimization program?

A40.1 Based on the BC Hydro program model, the Company has started a pilot with customers who have multiple premises that span both BC Hydro's and FortisBC's respective service areas (eg: Health Authorities). FortisBC has engaged the services of Portland Energy Conservation, Inc. (PECI) to provide the templates for the Building Optimization Program. PECI provided the program templates for the BC Hydro program.

41.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 57.2 and 61.1 Incentive Levels

Q41.1 Please complete the following table for Residential, General Service Programs and Industrial Programs. Please alter or add values, headings and program names to make the table comprehensive of all programs planned by Fortis for the 2011 DSM Plan. Where programs offer an incentive on a per unit basis (i.e. $*x* rebate per lightbulb), please list the incentive levels offered per unit.

		2010				2011			
	Program	Total Program Cost ($000s)	Savings (MWh)	TRC	Incentive Level (¢/kWh)	Total Program Cost ($000s)	Savings (MWh)	TRC	Incentive Level (¢/kWh)
Residential	Building Envelope								
	Heat Pumps								
	Lighting								
	New Home								
	Appliances								
	Electronics								
	Water Heating								
	Low Income								
	Behavioural								
General Service	Lighting								
	Building Improvement Weatherization Building Envelope Refrigeration HVAC Pumps and fans Compressed air								
	Computers Servers/Networks								
	Municipal Wastewater Irrigation								
Industrial	Integrated Building Optimization								
	Industrial Efficiency Lighting Pumps and Fans Refrigeration Motor Rewinds Compressed air Information Systems								
Irrigation	Hi/Med to Low Press pivot Pump Nozzle/Gasket Hi-efficiency motors								

A41.1 Please see Table BCUC IR2 A41.1 below.

Table BCUC IR2 A41.1

		2010				2011			
	Program	Total Program Cost ($000s)	Savings (MWh)	TRC	Incentive Level (¢/kWh)	Total Program Cost ($000s)	Savings (MWh)	TRC	Incentive Level (¢/kWh)
Residential	Building Envelope	309	953	0.7	24.6	1379	5460	1.7	20.5
	Heat Pumps	629	6377	1.7	5.3	694	3397	1.4	15.7
	Lighting	248	2383	2.2	4.5	438	3420	2.4	8.1
	New Home	268	1392	1.3	13.9	54	105	1.4	46.7
	Appliances					245	680	3.0	31.3
	Electronics					49	180	4.8	22.8
	Water Heating					162	960	2.1	12.1
	Low Income	120	1000	3.8	10.0	305	540	3.0	35.8
	Behavioural					310	1680	6.8	16.1
General Service	Lighting	731	5304	1.1	9.1	1080	7130	2.4	11.1
	Building Improvement	589	6138	1.7	5.3	572	3010	2.8	15.0
	Computers Server/Network					34	240	2.6	10.2
	Municipal Wastewater	74	613	2.4	4.8	432	3560	4.0	8.9
Industrial	Integrated Building Optimization					10	80	0.5	11.3
	Industrial Efficiency	404	3350	1.8	8.2	603	9280	5.2	5.0
Irrigation	Low Press pivot Pump Nozzle					40	580	7.1	4.0

42.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 69.2
Energy Saving Kits

FortisBC states "Phase 2 of the program is to provide installation of the kits. The details of this phase are still being determined, primarily because FortisBC is partnering with Terasen Gas and BC Hydro to deliver a consistent program throughout British Columbia."

Q42.1 When does FortisBC estimate Phase 2 of the ESK program will begin? Will Phase 2 be retroactive? For example, will households that received kits in previous years be provided with installation support from Phase 2 of the program?

A42.1 FortisBC expects Phase 2 to begin mid-2011. Phase 2 would be retroactive if an organization requests assistance and demonstrates that it has not been able to install the ESKs delivered to it in Phase 1.

43.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 74.1 Supporting Components

Table BCUC IR1 A74.1a

Monitoring and Evaluation Planning and Evaluation	• Incorporate new programs into program and perform studies on existing programs • Perform studies on existing programs • Establish M&E Plan for 2012 and beyond	$750

Conservation Culture	NA	NA	NA	NA	$141	$148	$200
Education Programs	NA	NA	NA	NA	$91	$91	$250
Codes & Standards	NA	NA	NA	NA	NA	NA	$25
Community Engagement	NA	NA	NA	NA	NA	NA	$250
Planning & Evaluation	$363	$314	$324	$419	$503	$519	$750

Q43.1 Please provide a more detailed plan for the use of the $750,000 budgetted for Planning and Evaluation.

A43.1 Please refer to the Application, Appendix 3, pp 35-36 (Exhibit B-1) where the Planning and Evaluation (described as "Monitoring and Evaluation" [M&E] in the Application) are discussed in detail. A more detailed budget breakdown is also provided as Table BCUC IR2 A43.1 below.

Table BCUC IR2 A43.1

Planning and Evaluation	2011	
	($000s)	%
Planning		
Salaries, Manager and Engineer (loaded)	305	
Office Expense (travel, telephony, training)	50	
Consultants	75	
DSM Advisory Committee	10	
Sub-total	**440**	**59%**
Evaluation		
Salaries, Monitoring and Evaluation Analyst (loaded)	115	
Office Expenses	10	
Monitoring and Evaluation Reports	175	
Monitoring and Evaluation Plan 2012-2015	10	
Sub-total	**310**	**41%**
Total Planning and Evaluation	**750**	**100%**

Q43.2 Please provide an updated table showing the total annual DSM budget and the percentage of total budget allocated to Planning and Evaluation, for the years 2005-2011.

A43.2 An updated table showing the percentage of total budget allocated to Planning and Evaluation (P&E) for the years 2005 – 2011 is provided as Table BCUC IR2 A43.2 below.

Table BCUC IR2 A43.2

	2005	2006	2007	2008	2009	2010	2011
	Actual					Approved	Plan
	($000s)						
P&E	$363	$314	$324	$419	$402	$519	$750
Total DSM	$2,350	$2,241	$2,549	$2,683	$3,464	$3,952	$7,842
Per cent attributable to P&E	15%	14%	13%	16%	12%	13%	10%

Q43.2.1 If the percentage of total budget allocated to Planning and Evaluation has increased from 2010 to 2011, please provide explanation and justification as to why.

A43.2.1 The Planning and Evaluation budget has not increased on a percentage basis as can be seen from Table BCUC IR2 A43.2.

44.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 75.1 Supporting Components – Education Programs

Q44.1 Please compare the education program for students enrolled in post-secondary institutions offered by BC Hydro and Terasen Gas with that of FortisBC.

A44.1 FortisBC understands that BC Hydro has helped to develop curriculum for the BCIT Energy Manager Training, Douglas College's Building Environmental Systems and UBCO's Building Sustainability programs. BC Hydro also supports trades associations' upgrade training with sponsorship support. Terasen Gas similarly supports post-secondary trades training through trades associations, but has not been involved in curriculum development.

FortisBC has provided support funding for trades training throughout its service area and more recently helped to coordinate and fund solar hot water installation and inspections training courses in partnership with Northern Lights Community College. It is planning to expand the support for trades training in 2011 and as opportunities arise, increase support for college-based training programs within its service area.

45.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 80.1 and 81.1 Surveys

FortisBC states "Mail and email addresses were provided from the FortisBC Billing Database. The list was checked for duplicates and partial addresses. Any duplicates or partial addresses were removed prior to mailing."

Q45.1 Were the questions in the surveys used for Public Consultation and the Customer End-Use Study statistically validated?

A45.1 The survey / feedback forms for the public consultation were not statistically validated. The consultation forms specifically asked about three DSM program options as presented in the consultation materials during the public open houses and meetings and on the FortisBC website.

Based on the sample sizes the FortisBC REUS is accurate within ±2.2 per cent, and the CEUS to within ±5.0 per cent at the 95 per cent confidence level.

46.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 85.1 Conservation Potential Demand Review (CPDR)

FortisBC states "The CDPR escalates the marginal cost of energy in current dollars by the 2 per cent inflation to arrive at a future nominal marginal cost of energy and then discounts the annual energy cost using the nominal discount rate of 10 per cent. If the marginal cost of energy was not escalated, the appropriate discount rate would [ ] the real discount rate of 8 per cent."

Q46.1 Please provide the missing word in the last sentence indicated by parentheses.

A46.1 The missing word is "be". The sentence should read "If the marginal cost of energy was not escalated, the appropriate discount rate would be the real discount rate of 8 per cent."

47.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 88.2.1 CPDR

FortisBC states "Historical experience has shown that having a consistent long-term offer in the market and building working good working relationships trade allies and suppliers is critical to the success of the DSM program. In addition, Company will continue to pursue collaborative efforts with government, both local and senior, other public utilities, and environment non-governmental organizations."

Q47.1 What specific actions are FortisBC taking to build good working relationships with trade allies and suppliers?

A47.1 FortisBC maintains active contact lists of contractors, electricians, trade organizations so that it can communicate quickly and effectively with them. Communication includes face-to-face and telephone communication, emailed messages whenever there may be changes in programs, staff attendance at trade organization functions and events and invitations to training sessions about FortisBC programs (lunch and learns, counter-top discussions, etc.). FortisBC also has membership in a number of trade organizations, including several staff holding board positions. The Company also provides sponsorship funding for a number of trade organization events.

Q47.2 Has FortisBC developed a network of trained trades people or trade allies to deliver its DSM programs? If not, does FortisBC plan to do so and when?

A47.2 FortisBC has worked closely with heating and plumbing trades people to help deliver its programs over the past ten years and with the electrical product wholesalers to deliver lighting "product option" rebates over the last three years. FortisBC is working with a number

of local and national retail stores to help deliver lighting and appliance programs. FortisBC expects those relationships to expand as more standardized programs are introduced into the marketplace.

48.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 91.1 and 92.1 CPDR

Table BCUC IR1 A91.1

Residential End-Use	2008 GWh	2030 GWh	Difference GWh
Space Cooling	123	189	66
Space Heating	370	439	68
Ventilation	42	48	5
Water Heating	168	214	45
Cooking	139	170	31
Refrigerator	120	144	24
Freezer	62	72	9
Dishwasher	6	7	1
Clothes Washer	8	9	1
Clothes Dryer	88	103	15
Lighting	234	331	97
Computer	118	150	31
Television	62	162	100
TV Peripherals	68	76	8
Other Electronics	0	1	0
Pools & Hot tubs	11	13	1
Small Appliances & Other	99	122	23
Total	1720	2247	528

Table BCUC IR1 A92.1

Commercial End-Use	2008 MW	2030 MW	Difference MW
Space Cooling	0	0	0
Space Heating	165	196	31
Ventilation	31	37	6
Water Heating	19	23	4
Cooking	50	59	10
Refrigerator	14	16	2
Freezer	6	7	1
Dishwasher	2	2	0
Clothes Washer	2	3	0
Clothes Dryer	28	33	4
Lighting	58	73	14
Computer	8	9	2
Television	11	14	2
TV Peripherals	3	4	1
Other Electronics	3	4	1
Pools & Hot tubs	8	9	1
Small Appliances & Other	18	20	2
Total	427	508	81

Q48.1 How has FortisBC incorporated this analysis into its program planning? For example, does FortisBC plan to implement and increase programs based on the greatest differences in end-use from 2008 to 2030?

A48.1 The programs selected in the 2011 DSM Plan target those end-uses that have the most cost effective energy efficiency measures. For example, although "Residential Cooking" shows a significant end-use load, there are no current cost-effective DSM solutions (aside from fuel switching) available to directly reduce that load. General education and awareness campaigns can be expected to have an impact on all end-use loads. Generally, however, the major increases in end-use load identified in the tables above are addressed in the 2011 DSM Plan.

Q48.2 Does FortisBC target DSM programs to specific customers based on billing data? If not, does FortisBC plan to implement targeted DSM programming?

A48.2 At this time the Company does not plan to implement targeted DSM programming based on billing data.

49.0 Reference: Exhibit B-4, FortisBC Responses to BCUC IR1 103.2 and 88.2
Conservation Potential Demand Review (CPDR)

Q103.2 For each of the customer classes, please summarize the top 3 categories of achievable energy savings?

A103.2 The following results are based on the 20-year potential:
Residential - Lighting; Building Envelope; and Water Heating
Commercial - Lighting; HVAC; and Refrigeration
Industrial - Fans (cross-industry); Lighting; and Compressed air
FortisBC states "A88.2 The primary factor in increasing energy efficiency achievement and peak demand savings since 1998 has been increasing program expenditures. Energy efficiency achievements have closely tracked program expenditures..."

Q49.1 Given FortisBC's statement in IR 88.2, why are the top 3 categories identified for achievable energy savings in IR 103.2 not the highest categories for expenditure for each of the customer classes in the 2011 DSM Plan?

A49.1 There is no direct correlation between program expenditures and achievable energy savings on a measure-by-measure basis. The magnitude of the expenditure required to achieve a particular quantum of energy savings can vary considerably. However, the proven experience of FortisBC is that on an aggregate basis, expenditures directly correlate with savings.

50.0 Reference: Exhibit B-4, FortisBC Response to BCUC IR1 106.1 Conservation Potential Demand Review (CPDR)

Table BCUC IR1 A106.1

Program/Sector	RIM	Cost ($000s/GWh)
Building Envelope	1.53	253
Heat Pumps	1.54	204
Lighting	1.48	128
New Home	1.24	3,600
Appliances	1.11	360
Electronics	1.19	272
Water Heating	1.58	169
Low Income	1.17	391
Behavioural	1.23	185
Residential Total	**1.50**	**218**
Lighting	1.67	151
BIP	1.75	190
Computers	3.64	142
Muni Wtr/IRR	1.77	121
Gen Svc Total	**1.71**	**152**
EMIS	2.3	125
Ind. Efficiency	2.66	65
Industrial Total	**2.66**	**66**

Q50.1 Please provide a version of Table BCUC IR1 A106.1 showing estimates of the ¢/kWh impact to Residential, General Service, Industrial and Irrigation rates for each of the programs?

A50.1 The following table shows the requested figures and ratios for 2011. The first column RIM (BCR) expresses the Rate Impact Measure in terms of a Benefit/Cost ratio, the second column is the first year Utility Cost per GWh, and the last column the levelized rate impact in cents per kWh for those kWh obtained from the measure (negative values denote a reduction in rates). The calculations are based on the long-term marginal cost, as specified in the DSM Regulation, to calculate the power purchase benefit.

1 **Table BCUC IR2 A50.1**

Program/Sector	RIM (B/C ratio)	Utility Cost ($000s/GWh)	Levelized Rate Impact (¢/kWh)
Building Envelope	1.53	253	-5.2
Heat Pumps	1.54	204	-5.3
Lighting	1.48	128	-4.8
New Home	1.24	3,600	-2.9
Appliances	1.11	360	-1.0
Electronics	1.19	272	-2.3
Water Heating	1.58	169	-5.6
Low Income	1.04	546	-0.3
Behavioural	1.23	185	-1.9
Residential Total	**1.50**	**221**	**-5.1**
Lighting	1.67	151	-6.2
BIP	1.75	190	-6.6
Computers	3.64	142	-4.1
Muni Wtr/IRR	1.77	121	-7.2
Gen Svc Total	**1.71**	**152**	**-6.4**
EMIS	2.3	125	-8.7
Ind. Efficiency	2.66	65	-9.6
Industrial Total	**2.66**	**66**	**-9.6**

2

1.0 Reference: Exhibit B-1, page 3
BCUC #1.1.2

Q1.1 In most instances the response to BCUC 1.1.2 states that the "variance is within the level of accuracy of the estimates". What is considered to be the level of accuracy of the estimates for the historical years included?

A1.1 FortisBC considers the level of accuracy to be +/- 10 percent for those projects for which it has completed detailed engineering, and +/- 25 percent for projects for which detailed engineering has not been completed. "Budget" values in each year are a combination of projects having and hot having detailed engineering completed. The variance explanation for each category in Table BCUC IR1 A1.2 reflects the net of individual project variances.

Q1.2 What is considered to be the level of accuracy of the forecast spending estimates for 2011 and 2012?

A1.2 Projects within the sustaining capital categories have not had detailed engineering completed (for example, see the responses to BCUC IR No. 1 Q 16.1 and Q19.2), while the majority of the remaining 2011 projects fall within the +/- 10% accuracy class.

2.0 Reference: Exhibit B-1, page 10
BCUC #1.2.2

Q2.1 With respect to the Table BCUC IR1 A2.2, please indicate the "capital additions" anticipated based on the "approved" level of capital spending per G-162-09.

A2.1 The 2010 Capital Additions anticipated based on the approved level of capital spending approved by Order G-162-09 are as follows:

Table BCOAPO IR2 A2.1

Category	**2010 Capital Additions Order G-162-09**
	($000s)
Hydraulic	22,990
Transmission	85,724
Distribution	37,869
General Plant	13,871
Total	**160,454**

3.0 Reference: Exhibit B-1, page 10
BCUC #1.2.3

Q3.1 Please include 2011 in the table.

A3.1 Please see Table BCOAPO IR1 A3.1 below.

Table BCOAPO IR1 A3.1

Asset Categories	2006					2007				2008			
	Opening Balance	Additions	Retirements	Ending Balance	PLP Dec 31, 2006	Opening Balance	Additions	Retirements	Ending Balance	Opening Balance	Additions	Retirements	Ending Balance
Generation	117,202	16,093	(46)	133,249	-	133,249	14,799	(617)	147,431	147,431	4,952	(358)	152,025
Transmission and Stations	224,407	18,678	(546)	242,539	-	242,539	33,051	(78)	275,512	275,512	50,876	(15)	326,373
Distribution	388,805	63,060	(2,947)	448,918	13,308	462,226	56,320	(2,281)	516,265	516,265	36,363	(2,821)	549,807
General Plant													
Buildings	21,540	2,570	(12)	24,098	802	24,900	4,203	-	29,103	29,103	1,567	-	30,670
Furniture	4,689	243	-	4,932	54	4,986	247	-	5,233	5,233	363	(1)	5,595
Vehicles	8,797	3,337	(404)	11,730	935	12,665	4,431	(649)	16,447	16,447	1,628	(1,512)	16,563
Tools	7,785	860	-	8,645	303	8,948	936	-	9,884	9,884	682	-	10,566
Other (IT/Communications)	47,213	7,315	(326)	54,202	206	54,408	8,236	(449)	62,195	62,195	11,825	(163)	73,857
Total	**820,438**	**112,156**	**(4,281)**	**928,313**	**15,608**	**943,921**	**122,224**	**(4,074)**	**1,062,070**	**1,062,070**	**108,256**	**(4,870)**	**1,165,456**

Asset Categories	2009				2010 FORECAST				2011 FORECAST			
	Opening Balance	Additions	Retirements	Ending Balance	Opening Balance	Additions	Retirements	Ending Balance	Opening Balance	Additions	Retirements	Ending Balance
Generation	152,025	17,292	(840)	168,477	168,477	23,678	(840)	191,315	191,315	34,172	(840)	224,647
Transmission and Stations	326,373	11,870	(42,809)	295,434	295,434	79,789	(42,809)	332,414	332,414	68,381	(42,809)	357,986
Distribution	549,807	70,484	38,077	658,368	658,368	35,410	42,475	736,253	736,253	34,185	42,475	812,913
General Plant												
Buildings	30,670	6,203	846	37,719	37,719	967	846	39,532	39,532	3,652	846	44,030
Furniture	5,595	5	(127)	5,473	5,473	785	(127)	6,131	6,131	176	(127)	6,180
Vehicles	16,563	2,342	(1,353)	17,552	17,552	2,000	(1,353)	18,199	18,199	2,000	(1,353)	18,846
Tools	10,566	658	(355)	10,869	10,869	545	(355)	11,059	11,059	1,371	(355)	12,075
Other (IT/Communications)	73,857	6,920	(1,193)	79,584	79,584	7,605	(1,193)	85,996	85,996	13,778	(1,193)	98,581
Total	**1,165,456**	**115,774**	**(7,754)**	**1,273,476**	**1,273,476**	**150,779**	**(3,356)**	**1,420,899**	**1,420,899**	**157,715**	**(3,356)**	**1,575,258**

4.0 Reference: Exhibit B-1, pages 13-15

Q4.1 Please provide a schedule that compares the cost of the following projects at the time of their original approval with the current cost estimate and explain any material variances:

- **South Slocan Unit 1 Life Extension**
- **Corra Linn Unit 1 Life Extension**
- **Corra Linn Unit 2 Life Extension**
- **Generating Plants Upgrade Station Service Supply**

A4.1 Please see Table BCOAPO IR1 A4.1 below.

Project No. 3698603: FortisBC 2011 Capital Expenditure Plan
Requestor Name: BCOAPO et al.
Information Request No: 1
To: FortisBC Inc.
Request Date: September 10, 2010
Response Date: October 1, 2010

Table BCOAPO IR1 A4.1

PROJECT NAME	2005	2006	2007	2008	2009	2010	2011	2012	Total	Forecast 2010 as per RR 2010		VARIANCE REMARKS
South Slocan Unit 1 Life Extension												
Approved	468				12,182				12,650	Expenditure till 2010:	16,490	The variance from original approval is due to escalation in material costs as described in the 2009 - 2010 Capital expenditure plan that approved the current project Budget of $17.61 million.
Actual	-	244	3,160	2,433	8,135	1,805	41	-	15,818	Plant in Svc till 2010:	16,490	
Variance - Over / (Under)	(468)				3,636				**3,168**			
Corra Linn Unit 1 Life Extension												
Approved				881	8,600	2,354	-	-	11,835	Expenditure till 2010:	13,370	The variance from original approval is due to escalation in material costs and the addition of a replacement turbine as described in the 2009 - 2010 Capital expenditure plan that approved the current project Budget of $18.95 million.
Actual	-	-	102	650	2,611	10,142	2,433	-	15,938	Plant in Svc till 2010:	-	
Variance - Over / (Under)	-	-	102	(231)	(5,989)	7,788	2,433	-	**4,103**			
Corra Linn Unit 2 Life Extension												
Approved						2,987	12,669	3,429	19,085	Expenditure till 2010:	2,985	
Actual	-	-	-	-	33	3,215	12,373	3,464	19,085	Plant in Svc till 2010:	304	
Variance - Over / (Under)	-	-	-	-	33	228	(296)	35	**-**			
Generating Plants Upgrade Station Service Supply									-			
Approved			255	473		3,057			3,785	Expenditure till 2010:	2,989	The variance from original approval is due to escalation in material and increased engineering costs as described in the 2009 - 2010 Capital expenditure plan that approved the current project Budget of $5.01 million.
Actual	-	-	672	498	646	1,508	1,309	378	5,011	Plant in Svc till 2010:	2,820	
Variance - Over / (Under)			417	25		784			**1,226**			

5.0 Reference: Exhibit B-1, page 15
BCUC #1.3.2

Q5.1 Please provide a schedule outlining any failures or problems that have occurred during the last 5 years with the Upper Bonnington Spill Gate.

A5.1 There have been no problems in the last five years, however it is important to note that the gate has not been routinely operated or exercised since the late 1980s due to the concerns associated with it.

Q5.2 Has FortisBC undertaken a formal risk assessment of the Bonnington Spill Gate? If so, please provide. If not, what is the basis for the conclusion that there is an unacceptable "risk of failure"?

A5.2 FortisBC has not completed a formal risk assessment of the Upper Bonnington Spill Gate as the Company does not believe the level of expenditures required to complete such an assessment are necessary considering both the age of the gates and the high risk of failure associated with them.

The conclusion that an unacceptable high risk of failure exists is based on both the age of the gate, and the potential outcomes resulting from either the spill gates failing outright, or failing to open when required. As noted in the responses to BCUC IR No. 1 Q3.1, Q3.2 and Q3.3, the consequences related to such a failure include loss of generation, or flooding of the powerhouse and the associated financial, environmental and safety impacts.

6.0 Reference: Exhibit B-1, pages 15-16

Q6.1 Has FortisBC undertaken a business case analysis of moving to a "condition based maintenance program" (i.e., comparing the costs and benefits)? If so, please provide. If not, on what basis is the $0.243 M spending for the South Slocan Plant Automation deemed to be cost effective?

A6.1 FortisBC has not undertaken a business case specific to moving towards a condition based maintenance program. The proposed expenditures at South Slocan are intended to serve as a basis to develop such a business case to extend this technology and maintenance methodology to the other facilities.

A move towards a condition based maintenance program would ensure that FortisBC is able to allocate maintenance dollars to the equipment that requires it based on actual condition rather than predetermined time based intervals. In some cases, this may result in longer time periods between maintenance cycles. In other cases, maintenance may occur more frequently, but will prevent unwanted outage events. The automation project is also expected to provide some benefits through remote monitoring of key generation components, all of which provide short and long term benefits to customers.

7.0 Reference: Exhibit B-1, page 16

Q7.1 Does FortisBC have similar fire alarm panels at its other generating facilities? If not, why not and are there plans for similar installations?

A7.1 No, FortisBC does not have fire alarm panels at its other generating facilities. Due to the age of the plants, panels were not originally installed. The installation of panels at the remaining plants is planned for inclusion in future capital plan submissions.

8.0 Reference: Exhibit B-1, page 17
BCUC #1.7.1

Q8.1 Was a formal risk assessment completed regarding the windows at FortisBC's four generating stations? If yes, please provide. If not, what was the basis for determining that the Lower Bonnington plant had the highest risk of the four plants?

A8.1 An independent engineering report was completed to evaluate the condition of the windows at all facilities, and is provided as BCOAPO IR1 Appendix A8.1.

The basis for determining the risk at the Lower Bonnington facility is a combination of the age of the windows, their condition, the need to operate the windows on a regular basis for plant cooling and the potential for safety related issues.

9.0 Reference: Exhibit B-1, pages 17-18

Q9.1 What has been the actual/forecast annual level of spending on Minor Sustaining Capital for the period 2006-2010?

A9.1 Please see Table BCOAPO IR1 A9.1.

Table BCOAPO IR1 A9.1

	Minor Sustaining Generation Capital								
	2006		2007		2008		2009		2010
Project	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast
	($000s)								
Upper Bonnington Generator & Plant Cooling System Upgrade	-	-	-	-	160	205	3	2	-
All Plants Lighting	-	-	-	-	182	178		-	-
All Plants Pump Upgrades	-	-	-	-	210	185		-	-
LBO Power House Crane Upgrade	-	-	-	-	-	-	160	163	-
LBO Intake Area Upgrade 2009 Phase 1	-	-	-	-	-	-	353	282	-
LBO & UBO Comm .Network Comp.	-	-	-	-	-	-	87	86	296
UBO Extension Trash Rack Gantry Replacment	-	-	-	-	-	-	-	-	383
PST Credit	-	-	-	(965)	29	29	-	-	-
Lower Bonnington Misc. Upgrades	502	580	25	25	-	-	-	-	-
Upper Bonnington Misc. Upgrades	123	99	-	-	-	-	-	-	-
South Slocan Misc. Upgrades	233	246	-	-	-	-	-	-	-
Corra Linn Misc. Upgrades	128	106	164	167	-	-	-	-	-
Projects Under $150,000	-	(33)	503	356	625	574	595	523	649
Total	**986**	**998**	**692**	**(417)**	**1,206**	**1,170**	**1,198**	**1,056**	**1,329**

10.0 Reference: Exhibit B-1, page 18
BCUC #1.10.2

Q10.1 If an assessment has not been completed on the crane, what is the basis for the cost estimate?

A10.1 FortisBC has completed upgrades of a similar nature on the powerhouse cranes in its other facilities. The cost estimate is based on the scope of work completed on these cranes.

11.0 Reference: Exhibit B-1, page 24

Q11.1 Does FortisBC have any set standards in terms of the size of customer base required to justify the use of an N-0 vs. N-1 contingency planning criteria?

A11.1 There are currently no formal standards that define the level of transmission reliability (N-0 vs. N-1) required for a given load level or customer count. However, historically, FortisBC has typically considered an aggregate load level of approximately 50 MW as the threshold where two sources of transmission supply should be provided for a given area. In general, this means that it is acceptable for a single, large urban substation to have a single transmission supply; however, the combined load of two large urban substations would require two sources of supply. The existing FortisBC system is consistent with this de-facto standard.

Q11.2 Does FortisBC have any set standards as to the outage duration that is acceptable from an N-1 contingency and how it varies by the size of the population base?

A11.2 As discussed in the response to BCOAPO IR1 Q11.1, there are currently no formal standards that define the level of transmission reliability required for a given load level or customer count. When evaluating the appropriate reliability level for an area, professional judgment is used and this considers factors such as:

- Area peak load;
- Customer count;
- Nature of the load (urban vs. rural);
- Customer composition (residential vs. commercial/industrial);
- Availability of alternate supply sources;

- Availability of communications infrastructure;
- Environmental and societal impacts;
- First Nations impacts; and
- Overall cost-effectiveness of supply reinforcement.

12.0 Reference: Exhibit B-1, page 30

Q12.1 Please explain the significantly higher spending on Pine Beetle Kill Hazard Tree Removal in 2010 relative to either 2009 or 2011.

A12.1 Please see the response to BCUC IR No. 1 Q22.6

13.0 Reference: Exhibit B-1, page 31

Q13.1 What has been the actual/forecast annual level of spending on Station Condition Assessments and Minor Planned Projects for the period 2006-2010?

A13.1 Please see Table BCOAPO IR1 A13.1 below.

Table BCOAPO IR1 A13.1
Station Condition Assessments & Minor Planned Projects Forecast vs. Actual

	2006	2007	2008	2009	2010
	($000s)				
Forecast	1,508	1,145	1,186	620	680
Actual	1,132	2,043	1,200	732	

14.0 Reference: Exhibit B-1, page 34
BCUC #1.15.4.1

Q14.1 How will FortisBC determine which legacy metal-clad switchgear installations to address first?

A14.1 Since this project is a safety-driven initiative, the selection is determined by the risk exposure to employees. Stations where employees are more frequently working on or near legacy metal-clad switchgear receive priority. The timing for installation of relays is set so as to ensure that the arc-flash detection relays are in place prior to upcoming scheduled maintenance.

15.0 Reference: Exhibit B-1, page 37

Q15.1 Please indicate the number of new customer connects (by rate class) assumed in the expenditures for New Connects.

A15.1 As noted in the Application (Exhibit B-1, p. 36), the forecast expenditures for new connects are based on historical averages (2007-2009), adjusted for projected customer growth, inflation, and changes to overheads. A forecast of new connects by rate class is not included in the calculation of the forecast expenditures for New Connects. As these forecast expenditures are based on historical actual expenditures (which reflect the actual customer growth realized), the impact of anticipated customer growth is inherently captured in the calculation of the 2011 forecast expenditures for new connects. Although FortisBC is forecasting more new customer connects in 2011 as compared to 2010, and an increase in the cost of materials, labour and overheads, the Company has reduced the 2011 forecast expenditures for New Connects. The Company believes that the abnormally high customer growth experienced during 2007/08 has skewed the three year average upward and that a reduction to the forecast 2011 New Connect expenditures is warranted.

16.0 Reference: Exhibit B-1, page 37

Q16.1 For a number of spending programs, the 2011 estimates are based on a three year historical average adjusted for inflation and overheads. What inflation assumptions were used and what was the overhead adjustment specific for 2011?

A16.1 Inflation has been forecast at 2 per cent per year for 2010 and 2011. Engineering and overhead for 2011 are approximately 29 per cent for Transmission and Distribution projects. The increase in overheads from 2009 to 2011 is approximately 10 per cent.

The Company notes that the 2011 values calculated for its sustaining capital projects are affected by an increase in the rate of capitalized overheads to be applied in 2011, compared to the 2007 – 2009 period. This is a result of the Company's current PBR Plan (Order G-58-06 and G-193-08), which sets capitalized overhead at 20 percent of gross Operating and Maintenance Costs, which is applied on a pro rata basis by project, and a lower value of 2011 capital expenditures, before loadings, compared to recent years.

17.0 Reference: Exhibit B-1, page 41
BCUC #1.20.3

Q17.1 The response to BCUC 1.20.3 indicates that future expenditures on Line Rebuilds are based on historical averages. Given this, please explain why the projected spending for 2011 is significantly higher than any of the previous four years.

A17.1 Please refer to the response to BCUC IR No. 2 Q13.1.

18.0 Reference: Exhibit B-1, page 43
BCUC #1.22.6

Q18.1 Please explain the drop in total spending on Pine Beetle Kill Hazard Tree Removal between 2009 and 2010 and the significant increase in total spending for 2011 over 2010.

A18.1 Please refer to the response to BCUC IR No. 1 Q22.6

19.0 Reference: Exhibit B-1, pages 46-50
BCUC #1.26.3

Q19.1 Does the cost-benefit analysis provided in response to BCUC 1.26.3 take into account the fact that the failure of the communication equipment would have to coincide with a failure on the transmission system?

A19.1 Yes. Based on historical system events, failures of the communications system occur sufficiently frequently that they are likely to coincide with an outage on the transmission system. In fact, the historical evidence suggests that failures of the communications system are in fact more likely to occur during power system disturbances. Refer also to the response to BCMEU IR No. 1 Q16.2.

Q19.2 Please provide the derivation of the one hour outage affecting 100 MW of load every 2 years.

A19.2 As discussed in the response to BCUC IR No. 2 Q20.1, the Kelowna-area system is configured such that three radial 138-kV transmission lines supply the majority of the customer load. Further, due to operating requirements it is necessary to distribute this load such that approximately 40 per cent is supplied by 50 Line and another 40 per cent by 51 Line (the remainder is supplied by 55 Line). During medium to high load times, both 50 Line and 51 Line each normally carry approximately 100 MW of load. Consequently, an outage to either line will impact approximately 100 MW of customer load. These lines also have the most exposure to outages due to their lengths (as compared to the shorter 55 Line). Finally, as discussed in the response to BCMEU IR No. 1 Q16.2, historical evidence has demonstrated extended outages due to communications failures

which have occurred approximately every two years impacting this amount of load.

Q19.3 Please explain more fully why Option E is preferable to Option A. Under Option E, the capital costs are $3 M higher with savings in operating cost of $60 k/annum. Do the savings justify the higher capital cost? Does the potential for future meshing of the transmission system also have to be weighed in justifying Option E?

A19.3 The intent of the options analysis was not to suggest that the savings in current operating costs fully offsets the increased capital costs. Rather, it is the combination of the reduced operating costs as well as the flexibility of the system to support future developments (such as meshing of the transmission system, AMI communications and Smart Grid enhancements) which supports the higher capital cost of Option E. The Option A solution is incapable of meeting the communications needs of any of these future projects; thus, if and when these projects occur, FortisBC's operating costs will be higher than current annual expenditures since these future communication requirements would have to be met by third-party telecommunications providers.

20.0 Reference: Exhibit B-1, page 62
BCUC #1.36.1

Q20.1 If, as stated in BCUC 1.36.1, the higher spending in 2010 was to implement "the most beneficial or required enhancements" please explain why the level of spending for AM/FM Enhancements increases in 2011 over 2010.

A20.1 The increase in 2011 is primarily due to increased costs for software upgrades and resource costs. Enhancements and upgrades are ongoing on the AM/FM software, as with other enterprise solutions, to ensure supportability and to continually develop functionality for efficiency and business requirements.

21.0 Reference: Exhibit B-1, pages 63-64

Q21.1 Please provide cost comparison (including capital and OM&A costs) of continuing with ADP Canada as opposed to switching to Ceridian Canada Ltd.

A21.1 Please see Table BCUC IR2 A21.1 below.

Table BCUC IR2 A21.1
Cost Comparison - Ceridian vs. ADP

Option	Capital Cost	Annual Operating Cost
Continue to use ADP and implement work-arounds	$45,000	$135,000
Implement Ceridian payroll solution	$478,000	$65,000

It is important to note that the requirement to move to a new payroll provider is not only cost-driven. The ADP solution requires the addition of a manual process to address the insufficient capacity for employee and employer earning and deduction codes. This manual solution simply allows payroll to run, but does not allow FortisBC to

produce clear and complete payroll statements for its employees.

22.0 Reference: Exhibit B-1, page 65
BCUC #1.40.1

Q22.1 Please explain why the proposed 2011 spending for Telecommunications is significantly higher than that for either 2009 or 2010.

A22.1 Please refer to the response to BCUC IR No. 2 Q27.1.

23.0 Reference: BCUC # 1 48.1

Preamble

The 2008 UCA amendments mandated new DSM programs, such as low-income, rental and education programs in order for the DSM offerings to be considered adequate. These components increase costs as the utility shoulders a larger share, if not the full cost of such programs, but with proportionately smaller savings relative to the cost incurred.

Q23.1 Provide a table that shows the profile of the DSM Low income component(s) referred to above, include the following for low income, rental and education programs, prior to and after the implementation of the 2008 UCA (e.g.2006-2011)

a) List of measures
b) Annual savings and TRC C/B ratio per measure
c) Total TRC

A23.1 The June 2008 filing of the Company's approved 2009-2010 DSM approved plan pre-dated the November 2008 UCA amendments, and therefore did not include the mandatory program "adequacy". The education program(s) are listed under supporting initiatives. The following table is for the 2011 plan only.

Table BCOAPO IR1 A23.1

Measure	Savings (MWh)	Program Cost ($000)	Total TRC ($000s)	TRC test (B/C ratio)
ESK	335	$85	$85	2.4
Light retrofit[1]	205	$220	$220	1.1
Education	n/a	$250	$250	n/a

[1] Consists of audit and select weatherization measures (draftproofing, insulation)

Q23.2 Provide a breakdown of annual budgets (actual and forecast) between the three components referred to above

A23.2 Please see the response to BCOAPO IR1 A23.1 above.

Q23.3 Provide the following overall metrics by year for 2006-2011

a) Participants
b) Budget/annual kWh saved
c) TRC/budget ratio

A23.3 As metrics for the mandatory program "adequacy" components are only available for 2011, please see the response to BCOAPO IR1 A23.1 above.

24.0 Reference: BCUC #1.55.1 Attachment 2 TRC Assumptions

Q24.1 For the Residential Sector provide a comparison table/spreadsheet that compares the OPA Prescriptive Measures and Assumptions List (see below) input assumptions to those of Fortis for each of the listed measures http://www.powerauthority.on.ca/Page.asp?PageID=1224&SiteNodeID=483

A24.1 The 2010 CDPR referenced the Ontario Power Authority (OPA) as one of three sources of DSM measures for the 2010 CDPR report. Due to the length of the OPA Prescriptive Measures document (539 pages), as well as differences in the applicability of some measures (e.g. some measures were not obtained from OPA due to climatic differences), it is difficult to provide a meaningful comparison of all measures contained in the 2011 DSM Plan to the measures identified in the OPA document.

However, illustrative examples detailing the assumed energy savings are provided in Table BCOAPO IR1 A24.1 below (bolded figures were used in the 2011 DSM Plan):

Table BCOAPO IR1 A24.1

Measure	BC Hydro	North West Power and Conservation Council	Ontario Power Authority
	(kWhs)		
Energy Star Refrigerator	**75**	54	69
Clothesline	n/a	n/a	**225**
Heat Pump Water Heater	1661	**2,000**	2,500
Draftproofing (SFD)	**1,076**	n/a	1,682

Q24.2 Discuss/explain any material differences in input assumptions, including free ridership

A24.2 The introduction section of the OPA List states the following: "Free ridership rates and other net-to-gross adjustment factors are not included in any the Prescriptive List measures and assumptions. Adjustment factors are a function of program design, delivery, and measure type and should be determined and maintained on a regular basis through program evaluation research." This is consistent with the FortisBC approach. With respect to input assumptions generally, there are simply too many in the lengthy OPA document to provide a meaningful comparison. A cursory review revealed that many input assumptions are similar for similar measures.

Q24.3 Using the OPA Measures and Assumptions list input assumptions (where materially different), provide a revised version of Attachment 2 TRC assumptions.

A24.3 Please see the response to BCOAPO IR1 Q24.1.

Q24.4 Discuss the impact on the program Cost/ Benefit ratios

A24.4 Given that FortisBC cannot provide an answer to BCOAPO IR1 Q24.3, it cannot answer this question. Please also refer to the response to BCOAPO IR1 Q24.1.

25.0 References: BCUC #1.57,-Tables BCUC IR1 A57.1 and BCUC IR1 A57.2

Q25.1 For Low Income/Rental CDM/DSM provide a list of Service Organizations and Housing Associations and delineate their specific role(s) in the delivery of the Program - e.g. referral delivery agent etc.

A25.1 Please see Table BCOAPO IR1 A25.1 below.

Table BCOAPO IR1 A25.1

Name of Organization	Delivery Mechanism
Abbeyfield Orchard City Society - Bernard House	Information Delivery Channel
Access Resources Designs for Community Support	Information Delivery Channel
Adentist Community Services	Information Delivery Channel
Assistend Living Program - Ok Mental Health Services Society	Information Delivery Channel
Avonlea House - Avonlea Care Centre Ltd	Installation Offer
Bernard House - Karis Support Society	information Offer
Brookeside Residence	Installation Offer
Brookvale Care Centre Ltd : Brookvale House	Installation Offer
Cardington Appartments - Central Okanagan Mental Health and Addictions, Interior Health Authority	Installation Offer
Columbia Centannial Housing Society	Information Delivery Channel
Community Life Centre - Salvation Army	Information Delivery Channel/Distribution Centre
Community Living BC - (CLBC)	Information Delivery Channel

1

Table BCOAPO IR1 A25.1 cont'd

Name of Organization	Delivery Mechanism
Davies House - Karis Support Society	Information Delivery Channel
Esther Place Recovery House	Installation Offer
Evangel Family Manor	Installation Offer
Evangel Senior Apartments	Information Delivery Channel
Father Delestre Housing Society	Information Delivery Channel
Freedom's Door Recovery House	Installation Offer
Fuller House - Karis Support Society	Information Delivery Channel
Glenwood Place Society	Installation Offer
Good Samaritain Society - Mountainview Village	Installation Offer
H.O.P.E Outreach	Information Delivery Channel
Habitat for Humanity Kelowna	Information channel
Harmony House - Kelowna's Gospel Mission	Information Delivery Channel
Hildebrandt Homes	Installation Offer
Inn From the Cold	Information Delivery Channel
Interior Health Authority - Kelowna Health Centre	Information Delivery Channel
Jaycees Downtown Youth Centre - Ok Boys and Girls Club	Information Delivery Channel

Table BCOAPO IR1 A25.1 cont'd

Name of Organization	Delivery Mechanism
John Howard Society - Bedford Place	Installation Offer
Kelowna & District SHARE Society	Information Delivery Channel
Kelowna & District Society for Community Living	Information Delivery Channel/Installation Offer
Kelowna Community Food Bank	Information Delivery Channel/Distribution Centre
Kelowna's Women's Resource Centre	Information Delivery Channel
Kelowna Women's Shelter - Transition House	Information Delivery Channel
Kelowna's Gospel Mission	Information Delivery Channel
Lydia Place Recovery Centre - Karis Support Society	inforamtion channel
Madsen House	Installation Offer
McGivney Manor - IHA	Installation Offer
Men of Destiny - Kelowna's Gospel Mission	Installation Offer
Men's Hostel - Kelowna's Gospel Mission	Installation Offer
Ministry of Housing and Social Development - Kelown Interior Regional Office	Information Delivery Channel
New Opportunites for Women (NOW) Canada - Alexandra Gardner Women & Children Safe Centre	Installation Offer
Okanagan Advocacy and Resource Society	Information Delivery Channel
Okanagan Halfway House Society	Installation Offer

Table BCOAPO IR1 A25.1 cont'd

Name of Organization	Delivery Mechanism
Okanagan Manor - BC Housing/Seventh Day Adventist Church	Information Delivery Channel
Okanagan Metis & Aboriginal Housing Society	Installation Offer
Okanagan Valley Pregnancy Care Centre	Information Delivery Channel
Ozanam House - Society of St.Vincent De Paul of Central Okanagan	Information Delivery Channel
Penny Lane Transistion House - Okanagan Boys and Girls Clubs	Information Delivery Channel
Roslin House	Installation Offer
Rutland Community Food Centre - Kelowna Christian Centre	distribution
Rutland Health Centre - Interior Heath Authority	Information Delivery Channel
Seniors Housing Outreach - Seniors Outreach Services Society	Information Delivery Channel
Services Canada - Kelowna Service Centre	Information Delivery Channel
Shepherd's Reach Society - SRS	Information Delivery Channel
Society of Hope - Family Subsidized Rental Housing	Information Delivery Channel/Installation Offer
Society of Hope - Seniors Subsidized Rental Housing	Information Delivery Channel/Installation Offer
Southgate Manor Co-operative Association	Installation Offer
Spring Valley Care Centre	Information Delivery Channel/Installation Offer
St. Michael & All Angels Cathedral	Information channel

Table BCOAPO IR1 A25.1 cont'd

Name of Organization	Delivery Mechanism
St. Vincent De Paul Society	Information Delivery Channel
Sun Pointe Village - Baptist Housing Ministries	Information Delivery Channel
Sutherland House - Karis Support Society	Installation Offer
The Bridge Youth & Family Services - Lawrence Ave Residence	Information Delivery Channel
The Bridge Youth & Family Services - Transition Suite Support	Information Delivery Channel
Tomat House - Karis Support Society	Installation Offer
Village At Mill Creek	Information Delivery Channel
Wallace House - Karis Support Society	Installation Offer
White Heather Manor	Information Delivery Channel
Aspen Court	Installation Offer
C.M.H.A Unity House	Installation Offer
Chestnut Place	Installation Offer
Christopher Housing Society	Installation Offer
Kiwanis Senior Citizens Housing Society - Oliver	Information Delivery Channel
Lower Similkameen Community Services Society	Information Delivery Channel
Lower Similkameen Indian Band	Installation Offer

Table BCOAPO IR1 A25.1 cont'd

Name of Organization	Delivery Mechanism
Osoyoos Elks Senior Citizens Society	Information Delivery Channel
Osoyoos Food Bank (through the Baptist Church)	Information Delivery Channel
South Okanagan Women in Need Society	Information Delivery Channel/Installation Offer
St.Vincent De Paul Society	Information Delivery Channel
The Salvation Army Community Food Bank	information channel/distribution outlet
Upper Similkameen Indian Band	Installation Offer
Vermilion Court	Information Delivery Channel/Installation Offer
Aimee Beaulieu Transition House	Information Delivery Channel/Installation Offer
Alpha House	Information Delivery Channel/Installation Offer
Arrow and Slocan Lakes Community Services - Nakusp Food Bank	Information Delivery Channel/Distribution Centre
Boundary Community Food Bank	Information Delivery Channel/Distribution Centre
Boundary Women's Transition House	Information Delivery Channel/Installation Offer
Castlegar Community Harvest Food Bank	Information Delivery Channel/Distribution Centre
Castlegar Salvation Army Community Services Food Bank	Information Delivery Channel/Distribution Centre
Employment and Income Assistance Office - Ministry of Housing and Social Development	Information Delivery Channel
Employment and Income Assistance Office - Ministry of Housing and Social Development	Information Delivery Channel

Table BCOAPO IR1 A25.1 cont'd

Name of Organization	Delivery Mechanism
Employment and Income Assistance Office - Ministry of Housing and Social Development	Information Delivery Channel
Employment and Income Assistance Office - Ministry of Housing and Social Development	Information Delivery Channel
Gospel Chapel (MB) Food, Clothing, and Support Services	Information Delivery Channel
Harbour House	Information Delivery Channel/Installation Offer
Kaslo Food Bank, St. Andrew's United Church Hall	Information Delivery Channel
Lower Kootenay Band - Social Housing Coordinator	Installation Offer
Lower Similkameen Indian Band	Installation Offer
McKim Cottage	Installation Offer
Nelson Food Coalition - Nelson Food Cupboard	distribution
Nelson Salvation Army Community Services	Information Delivery Channel/Distribution Centre
Nelson Seniors Resource Centre	information centre
Rossland Food Bank	Information Delivery Channel/Distribution Centre
Salmo Food Bank	Information Delivery Channel/Distribution Centre
Second Stage Housing - Nova Vita	Installation Offer
Service Canada Centre - Nelson	information offer
Service Canada Centre - Trail	information centre

Table BCOAPO IR1 A25.1 cont'd

Name of Organization	Delivery Mechanism
St. Andrew's Anglican Church Trail - Food Bank	Information Delivery Channel/Distribution Centre
St. Saviours Pro-Cathedral Anglican Church - St. Saviors Food Cupboard	Information Delivery Channel/Distribution Centre
Sunshine Valley Community Services	Information Delivery Channel
Trail Salvation Army and Family Services/ Food Bank	Information Delivery Channel/Distribution Centre
W.E Graham Community Service Society - Slocan Area Food Bank	Information Delivery Channel/Distribution Centre
WINS Transition House	Installation Offer

Q25.2 Provide a list of Seniors' Organizations engaged and their roles in the delivery of the program.

A25.2 Seniors organizations were not separated from the service organizations and, therefore, are included in the above list.

Q25.3 Provide the analysis that leads to the increase in incentive for low income DSM from 10 c/kWh to 35.8 c/kWh.

A25.3 The 2010 Plan includes Energy Saving Kits (ESK) only, whereas the 2011 plan includes both ESKs and a number of more costly weatherization retrofits.

Q25.4 Delineate the additional measures added and provide the change in TRC and C/B ratio from 2010-2011.

A25.4 Please refer to the response to BCOAPO IR No. 1 Q23.1

Q25.5 Which measures were examined but not included? Provide the

TRC and C/B ratio for these.

A25.5 FortisBC is not aware of any measures that were examined but not included.

26.0 References BCUC #1.58.0
Exhibit B-1, Appendix 3, Section 3.4, p.25

Q26.1 Does FortisBC have a comprehensive profile of the existing housing stock (vintage etc) in its service areas? If so, provide a copy (summary).

A26.1 The 2009 REUS report (Exhibit B-1, Appendix B to Appendix 3) is the only housing stock profile the Company is aware of that specifically covers the FortisBC service area.

Q26.2 Does FortisBC base its target stock for delivery of HIP on a specific set of criteria? If so provide these and discuss how they are used in the targeting of homes for HIP.

A26.2 FortisBC does not target the delivery of the HIP program on a specific set of criteria, but promotes the program through trade allies, trade shows and its website.

Q26.3 Describe in detail the screening of individual homes for the HIP. Include the use of computer models, "A" audits and blower door results in the decisions regarding eligibility and which measures will be offered/installed.

A26.3 Under the current LiveSmart BC program (of which the HIP program is a part), a customer would request and co-pay for the pre-retrofit audit performed by a Certified Energy Advisor. The subsequent audit report provided will prioritize and itemize the recommended measures and identify whether LiveSmart rebates are available. In turn, FortisBC provides funding for certain LiveSmart measures.

Q26.4 Provide by measure, the average cost and the amount of incentive offered. For Low income/rental provide the

comparable information.

A26.4 Please see the response to BCUC IR1 Q55.2 for the unit costs of measures. The plan incentive by program is provided in the response to BCUC IR1 Q57.2. Individual measure incentive amounts for all measures have not yet been determined.

Q26.5 Are homeowners eligible for loans for their portion of the costs? If so provide details. If not, discuss why not.

A26.5 Customers are eligible only for heat pump loans at this time. Please also see the response to BCUC IR1 Q59.1.

27.0 References: BCUC #1.70.0
Exhibit B-1, Appendix 3, Section 3.4, p.30, Rental Accommodation Programs – Single and Multi-Family

Preamble

FortisBC states "In its second phase, to be introduced in mid-2011, the Company in collaboration with Terasen Gas and BC Hydro, will direct-market financial incentive offers to landlords, property managers and rental agencies to upgrade rental properties. Similar to the LiveSmart collaborative program, a suite of "whole home" rebates and incentives for energy building evaluations will be offered. Additional information collateral that target renters directly will also be provided to help inform landlords and renters."

Q27.1 Does FortisBC have a profile (type, age, fuel etc) of the Rental housing stock in its service area(s) for both low rise and high rise multifamily buildings? If so provide a copy (summary). Delineate Social housing from market rate rental units.

A27.1 The following tables, extracted from the FortisBC 2009 REUS, illustrate the profile of customers in rental housing units. The REUS did not segregate social housing from market rate rental units.

Table BCOAPO IR1 A27.1a

		Total	Apt/Condo Rental Total	Apartment, Condo Rentals	
				1-3 floors	4+ floors
"Age"	"18-24 yrs"	2%	12%	11%	14%
	"25-34 yrs"	7%	17%	13%	22%
	"35-44 yrs"	11%	11%	14%	7%
	"45-54 yrs"	19%	20%	21%	18%
	"55-64 yrs"	27%	9%	10%	7%
	"65+ yrs"	34%	31%	31%	32%
Total	Base	2015	101	59	43

Based on Table BCOAPO IR1 A27.1a above, twenty nine per cent of Renters in Apartments/condominiums are younger than 34 years of age compared to 9 per cent of the total Fortis customer base.

Table BCOAPO IR1 A27.1b

		Total	Apt/Condo Rental Total	Apartment, Condo Rentals	
				1-3 floors	4+ floors
"Please indicate the combined total income before taxes for your household in the last year"	"Under $20k"	8%	24%	20%	30%
	"$20k to $40k"	25%	32%	31%	32%
	"$40k to $60k"	23%	26%	30%	20%
	"$60k to $80k"	18%	9%	7%	12%
	"$80k to $120k"	17%	8%	11%	5%
	"$120k or over"	9%	1%	2%	
Total	Base	1739	95	56	39

Based on Table BCOAPO IR1 A27.1b above, twenty four per cent of Renters in Apartments/condominiums have household incomes less

than $20,000 compared to 8 per cent of the total FortisBC customer base.

Table BCOAPO IR1 A27.1c

		Total	Apt/Condo Rental Total	Apartment, Condo Rentals	
				1-3 floors	4+ floors
"Please indicate the fuels used to heat your home (main fuel)"	"Natural gas"	52%	12%	16%	7%
	"Electricity -including portable heaters"	38%	83%	78%	90%
	"Wood"	7%	2%	3%	
	"Bottled propane"	1%			
	Geothermal Water	1%			
	"Piped propane"	1%			
	"Oil"	1%	2%	3%	
	"Don't know"	0%	1%		2%
Total	Base	1968	97	58	40

Based on Table BCOAPO IR1 A27.1c above, 83 per cent of Renters in Apartments/condominiums heat their home using electricity compared to 38 per cent of the total Fortis customer base.

Q27.2 If FortisBC does not have such a profile, provide details on how FortisBC determines the target market(s) for this program.

A27.2 Please see the response to BCOAPO IR1 A27.1 above.

Q27.3 How does FortisBC address the issue of the "split incentive" i.e. landlords will benefit from an increase in the value of the property and lower utility bills, but may not pass on savings to tenants or may even increase rents?

A27.3 Please see the response to BCOAPO IR1 A41.2.

Q27.4 Clarify if the program supports in-suite measures in Multifamily Residential Buildings. Discuss eligibility and incentives relative to ownership of appliances and other equipment being replaced/upgraded.

A27.4 The program provides in-suite measures in Multifamily Residential Buildings. FortisBC does not take ownership of appliances and other equipment, but provides incentives for customers to purchase them.

28.0 References: BCUC #1.73.0
Exhibit B-1, Appendix 3, Section 3.4, p.31 Collaborative Program Summary

Preamble

FortisBC states "The LiveSmart BC: partnership with BC Hydro, Terasen Gas and the BC Ministry of Energy, Mines, and Petroleum Resources. LiveSmart BC is a residential retrofit program that encourages customers to upgrade building envelopes (insulation, windows, doors, draft proofing) and upgrade home space and water heating systems".

Q28.1 For the LiveSmart BC component of the residential DSM Program, describe in detail using an illustrative home example, how the *attribution criteria and rules* apply to electricity, gas and water savings between BC Hydro, Terasen Gas and FortisBC.

A28.1 Energy savings are attributed directly to the utility that is invoiced for the measure. The primary fuel used for space heating purposes is the first determinant of which utility (gas or electric) is invoiced by MEMPR for the measures installed. If electricity is the primary heating fuel, then the service area (BC Hydro or FortisBC) is the second determinant of which utility pays and receives attribution for the energy savings. In a few cases, such as high-efficiency gas furnaces with variable-speed furnace fans, the commensurate gas and electric savings are attributed to each utility on the basis of the energy savings and invoiced to the gas and electric utilities respectively.

If no utility is invoiced (in the case where the homeowner has propane or oil space heating, for example) the savings are attributed to MEMPR. FortisBC is not aware of how water savings may be attributed.

Q28.2 Has the BCUC approved these attribution criteria and rules? Please discuss and provide references to Commission findings.

A28.2 To the best of FortisBC's knowledge, the Commission has not approved these attribution criteria and rules.

Q28.3 For other current or planned joint programs, provide complete details of the utilities/agencies involved and the attribution criteria and rules that apply. Indicate if these have been approved by the BCUC.

A28.3 The same attribution rules apply to other joint programs. For example, the EnergyStar clothes washer pilot run in conjunction with Terasen Gas attributed the energy savings and program costs in proportion to the fuel (gas or electric) source for the domestic hot water.

The attribution rules have not been subject to a BCUC filing or approval.

29.0 References: BCUC #1.83.0
Exhibit B-1, Appendices B to Appendix 3, p.7 and Appendix C to Appendix 3, p.8 Comparison with BC Hydro 2006 Residential End Use Survey

Preamble

FortisBC states "In 2006, BC Hydro completed a comprehensive mail survey (REUS) with their residential customers across BC. Throughout this report, comparisons are made with the response collected from 1144 BC Hydro customers in the Southern Interior of BC."

Q29.1 Provide a Table that shows for each of the BC Hydro and FortisBC survey samples how many direct and indirect (and % of residential total) of the following customer types were included and how many (and % of residential total) were included in the survey response.

a) Senior Citizens (bill responsibility)
b) Low Income homeowners (bill responsibility)
c) Renters

A29.1 Please see Table BCOAPO IR1 A29.1 below. Please note, FortisBC does not have comparable information for BC Hydro.

Table BCOAPO IR1 A29.1

			Total	Total Household income before taxes		Age		Own or rent?	
			Total	Under $20k	$20k+	18-64	65+	Own	Rent
"FortisBC provides electricity to customers directly and indirectly through city wholesalers; Local wholesalers supply electricity to some areas of Kelowna, Penticton, Summerland, Grand Forks and Nelson; Are you a direct or indirect customer?"	No response	%	1%	1%	0%	1%	1%	1%	1%
		n	25	1	7	12	4	22	2
	"Direct FortisBC customer"	%	82%	76%	83%	83%	81%	83%	74%
		n	1682	107	1328	1111	549	1469	148
	"Indirect FortisBC customer"	%	11%	15%	11%	9%	15%	11%	11%
		n	231	21	178	123	104	200	22
	"Don't know"	%	5%	8%	5%	7%	3%	5%	14%
		n	111	11	86	88	23	80	29
Total	%		100%	100%	100%	100%	100%	100%	100%
	Base		2049	140	1598	1335	681	1771	201

Q29.2 If included, provide an analysis to show if the above target groups exhibited higher/ lower responses to the eight main areas than the average residential respondent.

A29.2 FortisBC is not certain which "eight main areas" the question refers to, but provides the following breakdown of responses by building types, region, age, rent vs own and customer type. A basic analysis of the table is also provided.

Table BCOAPO IR1 A29.2a
Type of Dwelling

			Total	Total Household income before taxes		Age		Own or rent?		Customer type	
				Under $20k	$20k+	18-64	65+	Own	Rent	Direct	Indirect
Type of dwelling	Single detached	%	69%	36%	70%	72%	62%	73%	32%	69%	68%
		n	1353	49	1075	925	401	1285	65	1113	150
	Duplex, Row, Townhouse	%	11%	12%	11%	11%	11%	10%	19%	11%	12%
		n	211	17	172	140	69	172	38	174	27
	Apartment, Condo	%	13%	28%	12%	11%	16%	9%	42%	12%	14%
		n	248	39	178	142	104	160	85	200	31
	Mobile, Other	%	8%	23%	7%	6%	12%	8%	7%	8%	6%
		n	159	31	107	80	77	144	13	130	12
Total	%		100%	100%	100%	100%	100%	100%	100%	100%	100%
	Base		1970	135	1532	1286	651	1762	201	1617	221

Income: Low income households are more likely to live in apartments, condominiums and mobile homes.

- 36 per cent of respondents with lower incomes (less than $20,000) live in single detached homes; compared to 70 per cent of respondents with higher household incomes (more than $20,000).
- 28 per cent of respondents with lower incomes (less than $20,000) live in apartments or condominiums; compared to only 12 per cent of respondents with higher household incomes.
- 23 per cent of respondents with lower incomes (less than $20,000) live in mobile homes; compared to only 7 per cent of respondents with higher household incomes.

Age: Older respondents are slightly more likely to live in mobile homes than their younger counterparts. Older respondents may be more likely to live in mobile homes since they are less expensive to purchase and larger living space may not be required.

- 12 per cent of respondents over 65 years live in mobile homes compared to 6 per cent of respondents under 65 years.

Own or Rent: Renters are more likely to live in apartments and condominiums.

- 42 per cent of renters live in apartments and condominiums compared to only 9 per cent of owners.
- 32 per cent of renters live in single detached homes compared to only 73 per cent of owners.

Table BCOAPO IR1 A29.2b
Region

			Total	Total Household income before taxes		Age		Own or rent?		Customer type	
			Total	Under $20k	$20k+	18-64	65+	Own	Rent	Direct	Indirect
Region	Central Okanagan, Kelowna	%	40%	35%	40%	41%	37%	38%	52%	42%	26%
		n	805	48	645	546	249	672	104	705	59
	South Okanagan, Similkameen	%	29%	31%	28%	26%	36%	30%	24%	27%	45%
		n	591	43	451	341	245	523	47	451	104
	West Kootenay, Boundary	%	31%	34%	31%	33%	27%	32%	25%	31%	29%
		n	630	47	498	441	179	554	49	517	66
Total	%		100%	100%	100%	100%	100%	100%	100%	100%	100%
	Base		2026	138	1594	1329	674	1749	200	1674	230

Income**:** Income levels were similar between the regions.

Age**:** Older respondents (65+ years) were slightly more likely (36%) to live in the South Okanagan- Similkameen than younger respondents (26%).

Own or Rent: Renters are more likely to live in the Central Okanagan/Kelowna (52%) than owners (38%).

Q29.3 Discuss reasons for any significant differences.

A29.3 Please see the response to BCOAPO IR No. 1 Q29.2 above.

30.0 References: BCUC #1.91
Exhibit B-1-1, Appendix D to Appendix 3, Page 40 Table 14

Q30.1 Provide a spreadsheet/table that shows from 1990-2009 actual and 2010-2030 forecast, the breakdown of the residential sector (including MURBS) service area housing stock in terms of archetypes, units, average electricity and energy use per unit and total electricity use.

A30.1 FortisBC does not have the requested data for 1990-2007, however Table BCOAPO IR1 A30.1 provide below contains the requested breakdown for the years 2008-2030.

Table BCOAPO IR1 A30.1

	Single Family Electric Heat Units	Single Family Non Electric Heat Units	Manufactured Homes Electric Heat Units	Manufactured Homes Non-Electric Heat Units	Apartments and Condos Electric Heat Units	Apartments and Condos Non-Electric Heat Units	Row and Townhouses Electric Heat Units	Row and Townhouses Non- Electric Heat Units
2008	31,030	69,067	3,073	8,308	14,942	3,735	6,619	9,140
2009	31,184	69,409	3,081	8,330	15,643	3,911	6,644	9,175
2010	31,430	69,956	3,094	8,364	16,784	4,196	6,685	9,232
2011	31,676	70,505	3,107	8,399	17,950	4,488	6,726	9,289
2012	31,831	70,851	3,115	8,421	18,699	4,675	6,753	9,325
2013	31,986	71,195	3,123	8,444	19,460	4,865	6,780	9,363
2014	32,141	71,539	3,131	8,467	20,234	5,059	6,807	9,400
2015	32,295	71,883	3,140	8,490	21,021	5,255	6,835	9,438
2016	32,449	72,225	3,149	8,513	21,821	5,455	6,862	9,477
2017	32,602	72,566	3,157	8,536	22,634	5,658	6,890	9,515
2018	32,755	72,906	3,166	8,560	23,460	5,865	6,919	9,554
2019	32,907	73,245	3,175	8,584	24,300	6,075	6,947	9,594
2020	33,059	73,583	3,184	8,608	25,153	6,288	6,976	9,633
2021	33,210	73,920	3,193	8,632	26,020	6,505	7,005	9,674
2022	33,361	74,255	3,202	8,657	26,902	6,725	7,034	9,714
2023	33,511	74,589	3,211	8,682	27,798	6,949	7,064	9,755
2024	33,661	74,922	3,220	8,707	28,708	7,177	7,094	9,797
2025	33,809	75,253	3,230	8,732	29,633	7,408	7,124	9,838
2026	33,958	75,583	3,239	8,758	30,573	7,643	7,155	9,880
2027	34,105	75,911	3,249	8,784	31,527	7,882	7,186	9,923
2028	34,254	76,242	3,259	8,810	32,492	8,123	7,217	9,966
2029	34,410	76,590	3,263	8,823	33,466	8,367	7,248	10,009
2030	34,567	76,940	3,268	8,837	34,450	8,613	7,280	10,053

Table BCOAPO IR1 A30.1 cont'd

	Single Family Electric Heat kWh	Single Family Non Electric Heat kWh	Manufactured Homes Electric Heat kWh	Manufactured Homes Non-Electric Heat kWh	Apartments and Condos Electric Heat kWh	Apartments and Condos Non-Electric Heat kWh	Row and Townhouses Electric Heat kWh	Row and Townhouses Non- Electric Heat kWh
2008	647,181,836	714,550,416	41,191,929	65,508,851	91,706,409	18,738,434	76,903,827	63,747,830
2009	611,290,293	762,565,549	37,961,689	65,302,689	102,377,985	21,209,692	71,280,117	72,644,517
2010	617,631,570	772,186,109	38,220,716	65,848,358	109,750,654	22,733,177	71,908,916	73,377,388
2011	624,158,950	782,204,810	38,487,900	66,413,613	117,790,247	24,416,135	72,562,669	74,142,556
2012	629,095,530	790,382,693	38,703,597	66,896,483	123,650,971	25,671,395	73,080,462	74,775,402
2013	634,043,942	798,594,681	38,920,988	67,382,925	129,655,199	26,959,044	73,603,001	75,413,989
2014	638,919,498	806,652,697	39,137,075	67,864,831	135,532,172	28,211,343	74,120,878	76,045,316
2015	643,804,701	814,740,797	39,354,820	68,350,189	141,549,116	29,495,049	74,643,370	76,682,188
2016	648,699,014	822,858,228	39,574,239	68,839,042	147,708,576	30,810,748	75,170,533	77,324,673
2017	653,601,890	831,004,211	39,795,355	69,331,433	154,013,133	32,159,034	75,702,422	77,972,839
2018	658,512,767	839,177,943	40,018,187	69,827,406	160,465,413	33,540,512	76,239,092	78,626,756
2019	663,431,068	847,378,598	40,242,754	70,327,006	167,068,080	34,955,797	76,780,601	79,286,493
2020	668,356,200	855,605,326	40,469,079	70,830,277	173,823,844	36,405,512	77,327,004	79,952,122
2021	673,287,556	863,857,249	40,697,181	71,337,265	180,735,455	37,890,293	77,878,361	80,623,713
2022	678,224,516	872,133,466	40,927,082	71,848,016	187,805,707	39,410,782	78,434,729	81,301,339
2023	683,166,441	880,433,049	41,158,802	72,362,577	195,037,440	40,967,636	78,996,168	81,985,074
2024	688,112,679	888,755,043	41,392,365	72,880,994	202,433,537	42,561,520	79,562,737	82,674,992
2025	693,062,559	897,098,467	41,627,790	73,403,316	209,996,928	44,193,109	80,134,497	83,371,167
2026	698,015,396	905,462,311	41,865,102	73,929,591	217,730,586	45,863,091	80,711,509	84,073,677
2027	702,970,487	913,845,539	42,104,320	74,459,866	225,637,535	47,572,162	81,293,836	84,782,597
2028	707,970,593	922,302,622	42,345,470	74,994,193	233,682,923	49,313,160	81,881,539	85,498,006
2029	713,137,250	930,999,704	42,528,774	75,430,180	241,871,333	51,087,202	82,476,438	86,222,407
2030	717,666,558	938,202,345	42,700,183	75,833,788	249,941,249	52,828,883	83,088,333	86,950,389

Table BCOAPO IR1 A30.1 cont'd

	Single Family Electric Heat kWh/Unit	Single Family Non Electric Heat kWh/Unit	Manufactured Homes Electric Heat kWh/Unit	Manufactured Homes Non-Electric Heat kWh/Unit	Apartments and Condos Electric Heat kWh/Unit	Apartments and Condos Non-Electric Heat kWh/Unit	Row and Townhouses Electric Heat kWh/Unit	Row and Townhouses Non- Electric Heat kWh/Unit	Total Units	Total MWh	Total MWh/Unit
2008	20,857	10,346	13,405	7,885	6,138	5,016	11,619	6,975	145,914	1,719,530	11.78
2009	19,603	10,986	12,322	7,840	6,545	5,423	10,728	7,917	147,377	1,744,633	11.84
2010	19,651	11,038	12,355	7,873	6,539	5,418	10,757	7,949	149,739	1,771,657	11.83
2011	19,704	11,094	12,389	7,907	6,562	5,441	10,788	7,982	152,139	1,800,177	11.83
2012	19,763	11,156	12,426	7,944	6,613	5,492	10,822	8,018	153,670	1,822,257	11.86
2013	19,822	11,217	12,462	7,980	6,663	5,541	10,856	8,055	155,217	1,844,574	11.88
2014	19,879	11,276	12,498	8,016	6,698	5,577	10,889	8,090	156,779	1,866,484	11.91
2015	19,935	11,334	12,533	8,051	6,734	5,612	10,921	8,125	158,356	1,888,620	11.93
2016	19,991	11,393	12,569	8,087	6,769	5,648	10,954	8,160	159,950	1,910,985	11.95
2017	20,048	11,452	12,604	8,122	6,805	5,683	10,987	8,195	161,559	1,933,580	11.97
2018	20,104	11,510	12,640	8,157	6,840	5,719	11,019	8,229	163,185	1,956,408	11.99
2019	20,161	11,569	12,675	8,193	6,875	5,754	11,052	8,264	164,827	1,979,470	12.01
2020	20,217	11,628	12,711	8,228	6,911	5,789	11,085	8,299	166,485	2,002,769	12.03
2021	20,273	11,686	12,747	8,264	6,946	5,825	11,117	8,334	168,160	2,026,307	12.05
2022	20,330	11,745	12,782	8,299	6,981	5,860	11,150	8,369	169,851	2,050,086	12.07
2023	20,386	11,804	12,818	8,335	7,016	5,895	11,183	8,404	171,560	2,074,107	12.09
2024	20,443	11,862	12,853	8,370	7,052	5,930	11,215	8,439	173,286	2,098,374	12.11
2025	20,499	11,921	12,889	8,406	7,087	5,965	11,248	8,474	175,028	2,122,888	12.13
2026	20,556	11,980	12,924	8,441	7,122	6,001	11,281	8,509	176,789	2,147,651	12.15
2027	20,612	12,038	12,960	8,477	7,157	6,036	11,313	8,544	178,567	2,172,666	12.17
2028	20,668	12,097	12,995	8,512	7,192	6,071	11,346	8,579	180,363	2,197,989	12.19
2029	20,725	12,156	13,032	8,549	7,227	6,106	11,379	8,614	182,176	2,223,753	12.21
2030	20,761	12,194	13,065	8,582	7,255	6,134	11,413	8,649	184,008	2,247,212	12.21

Q30.2 Provide notes on all important input assumptions.

A30.2 The key assumptions include saturations of appliances and end-use equipment in the various archetypes, as well as changes in these saturations over time.

Saturation information was based on the "2009 Customer End-Use Study" to establish saturation in the base year for each end use in each archetype. Many of the saturations were assumed to remain constant over the 20-year forecast period

Saturations that do change, include the following:

- Central air-conditioning is assumed to grow from a 50 per cent saturation to 70 per cent by 2030
- Window AC is assumed to grow from 16 per cent to 20 per cent by 2030
- Electric clothes dryer saturation grows from 92 per cent to 95 per cent
- Dishwasher saturation grows from 82 per cent to 85 per cent
- LCD flat screen TVs grow from 38 per cent to 243* per cent

  *more than one LCD TV per household
- CRT>32" TVs decline from 24 per cent to 5 per cent
- Overall number of light sockets increases in all archetypes (e.g., single family from 58.4 per home to 70 per home, apartment from 21.5 per home to 30.0 per home in 2030)
- Building growth rates increase according to the data in Table 2, page 20 of the CDPR (Appendix D to Appendix 3, Exhibit B-1)

Q30.3 Provide a line that provides the 1990-2009 actual Residential (including MURBs) GWh savings from Exhibit B-1-1, Appendix D to Appendix 3, pp.11-12 CDPR – Historic Conservation Achievement and the forecast 2010-2030

A30.3 Please see Table BCOAPO IR1 A30.3 below. Note, the forecast residential energy savings for 2010 is 12.1 GW.h, and 16.4 GWh in 2011.

The DSM forecast for the remaining period (2012-2030) has not been completed, and will be filed as part of the long-term DSM Plan to be filed in 2011.

Table BCOAPO IR1 A30.3

Year	Residential Sector Energy Savings (GWh)
1990	0.8
1991	2.2
1992	6.2
1993	3.7
1994	1.8
1995	5.4
1996	2.9
1997	1.4
1998	1.5
1999	2.9
2000	6.3
2001	5.5
2002	4.5
2003	6.4
2004	9.8
2005	9.5
2006	11.6
2007	15.3
2008	12.9
2009	9.3

Q30.4 Provide lines that show historic 1990-2009 actual and forecast 2010-2030 achievable potential based on assumptions of 85% of technical potential and 75% of economic potential

A30.4 The CDPR does not provide historic potential (1990-2009). Table BCOAPO IR1 A30.4 below details the CDPR forecast achievable potential for the residential sector.

Table BCOAPO IR1 A30.4

Year	Achievable Potential	Program Achievable
	GWh	
2011	24.0	18.6
2012	47.9	37.9
2013	71.9	56.7
2014	95.9	75.5
2015	119.8	93.6
2016	143.8	114.3
2017	167.8	136.0
2018	191.8	155.9
2019	215.7	174.4
2020	239.7	192.3
2021	263.7	210.2
2022	287.6	228.2
2023	311.6	246.1
2024	335.6	264.1
2025	359.5	282.1
2026	383.5	299.5
2027	407.5	317.0
2028	431.4	334.4
2029	455.4	351.9
2030	479.4	369.5
2031	479.4	369.5

31.0 References: Exhibit B-1-1 FortisBC Conservation and Demand Potential Review Page 6
Exhibit B1 Appendix 3 Appendix B

Preamble

For this analysis, FortisBC has completed end-use surveys for their residential and commercial customers. The results are used to guide which conservation measures are applicable as well as the corresponding saturation levels of those measures.

Q31.1 Provide a demographic profile of FortisBC's residential customers for each of the main service areas including

a) Age of person with primary bill responsibility (or whether 65+)
b) Household Income level
c) Domicile type e.g. house, apartment, (owner- occupied and rental)
d) Primary energy type(s)
e) Annual electricity use

FortisBC Customer Surveys, Statistics Canada, BC Hydro or other baseline data are acceptable

A31.1 Please see the tables below.

Table BCOAPO IR1 A31.1a
Age of Person with primary bill responsibility (or whether 65+)

		Total	Region		
			Central Okanagan, Kelowna	South Okanagan, Similkameen	West Kootenay, Boundary
"Age"	"18-24 yrs"	2%	3%	1%	1%
	"25-34 yrs"	7%	11%	3%	7%
	"35-44 yrs"	11%	13%	6%	13%
	"45-54 yrs"	19%	18%	16%	23%
	"55-64 yrs"	27%	24%	32%	27%
	"65+ yrs"	34%	31%	42%	29%
Total	Base	2015	795	587	620

Table BCOAPO IR1 A31.1b
Household Income level

		Total	Region		
			Central Okanagan, Kelowna	South Okanagan, Similkameen	West Kootenay, Boundary
"Please indicate the combined total income before taxes for your household in the last year"	"Under $20k"	8%	7%	9%	9%
	"$20k to $40k"	25%	21%	27%	27%
	"$40k to $60k"	23%	21%	27%	21%
	"$60k to $80k"	18%	18%	16%	20%
	"$80k to $120k"	17%	20%	15%	15%
	"$120k or over"	9%	12%	7%	7%
Total	Base	1739	693	494	546

Table BCOAPO IR1 A31.1c
Domicile Type e.g. house, apartment, (owner- occupied and rental)

		Total	Region		
			Central Okanagan, Kelowna	South Okanagan, Similkameen	West Kootenay, Boundary
"What type of dwelling do you live in?"	"Single detached house"	69%	54%	73%	83%
	"Duplex"	4%	5%	3%	2%
	"Row, townhouse -3+ units attached"	7%	12%	5%	2%
	"Apartment, condominium"	13%	22%	8%	4%
	"Mobile home"	8%	6%	11%	8%
	"Other"	0%	0%		0%
Total	Base	1970	776	569	601

Table BCOAPO IR1 A31.1d
Primary Energy Type(s)

		Total	Region		
			Central Okanagan, Kelowna	South Okanagan, Similkameen	West Kootenay, Boundary
"Please indicate the fuels used to heat your home (main fuel)"	"Natural gas"	52%	60%	47%	46%
	"Electricity -including portable heaters"	38%	34%	42%	38%
	"Wood"	7%	1%	7%	13%
	"Bottled propane"	1%	2%	1%	0%
	Geothermal Water	1%	1%	1%	0%
	"Piped propane"	1%	1%	1%	1%
	"Oil"	1%	0%	1%	1%
	"Don't know"	0%	0%	0%	0%
Total	Base	1968	774	572	601

Table BCOAPO IR1 A31.1e
Annual Electricity Use

		Total	Region		
			Central Okanagan, Kelowna	South Okanagan, Similkameen	West Kootenay, Boundary
Yearly Electricity Usage	5000 or less	21%	25%	22%	16%
	5001 - 10000	32%	39%	30%	26%
	10001 - 15000	20%	20%	19%	22%
	15001 - 25000	19%	11%	18%	29%
	25001+	7%	4%	12%	8%
Total	Mean KWH	11358	9491	12437	12760
	Base	871	343	237	287

32.0 Reference: Exhibit B1, Appendix 3, Appendix D, Page 61-62 and Appendix B

Preamble

According to work prepared by FortisBC, low-income households have some key characteristics that suggest potential opportunities for energy efficiency improvements. Low-income customers that live in single family homes have a higher level of energy intensity per square foot than customers living in the same housing type who are not low-income, even though low-income customers' total consumption is, on average, less than that of non-low-income customers.

Q32.1 Provide a Copy of Bill 15-2008 (summary in Appendix B noted).

A32.1 A copy of Bill 15-2008 is provided as BCOAPO IR1 Appendix A32.1.

Q32.2 Provide a copy of the Statistics Canada Data referred to on page 62 (summary).

A32.2 Please refer to BCOAPO IR1 Attachment A32.2 (BC Progress Board Performance Indicator #22, Low-Income Cut-Offs, 8th Annual Benchmark Report, 2008, page 65). A copy of the full report can be found at the following link:

http://www.bcprogressboard.com/pdfs/Bench_12_12_2008_S.pdf

Performance Indicator 22

Low Income Cut-Offs

Where BC Ranks

PROVINCIAL COMPARISON

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Rank	9	9	10	9	10	10	10	10	9	9

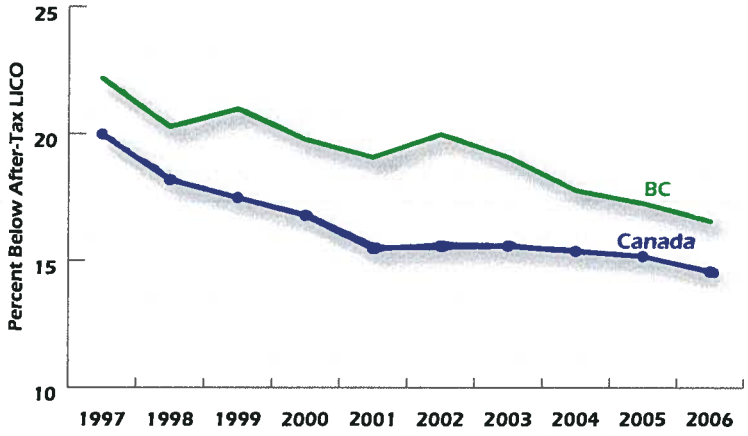
Performance Indicator Twenty-Two uses data on the number of people with incomes below a level identified by Statistics Canada as relatively low. The province with the lowest proportion earns the best rank.

In 2006, BC ranked second-last in Canada with 16.6 percent of families and unattached individuals with incomes below the after-tax low income cut-off (LICO).

All provinces saw decreases in the proportion of people with low income between 1997 and 2006. British Columbia had the third-smallest decrease at 25.2 percent and Alberta had the largest decrease at 45.4 percent. BC's rate fell by four percent between 2005 and 2006. This did not result in a rank improvement, however, because Saskatchewan, New Brunswick, Alberta and Manitoba had decreases in low income rates that were two or three times as large.

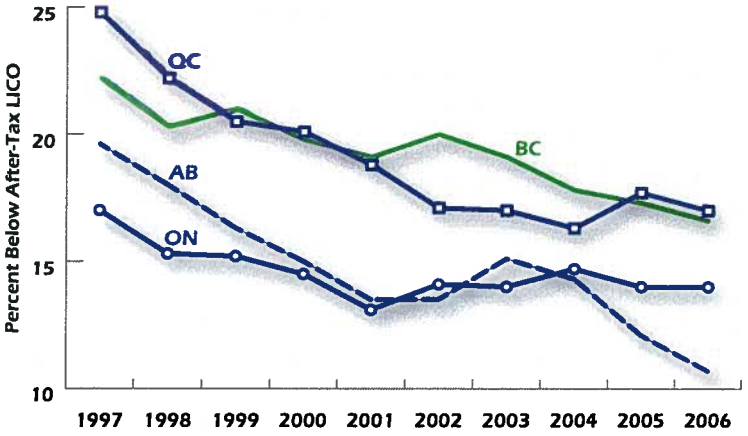
British Columbia was, however, the only province with decreases in its LICO rate in each of the last four years.

Low Income Prevalence for Families and Unattached Individuals



Sources: BC Progress Board; BC Stats; Statistics Canada

Provinces ~ Low Income Prevalence for Families and Unattached Individuals



Sources: BC Progress Board; BC Stats; Statistics Canada

Q32.3 How does FortisBC define/identify/qualify Low Income households/families? Identify criteria and sources of data.

A32.3 FortisBC uses the BC Progress Board Performance Indicator #22 Low-Income Cut-Off Scale (Statistics Canada, 2006) to identify low-income households.

Q32.4 How does ForrtisBC define/identify Senior-led households? Identify criteria and sources of data.

A32.4 FortisBC has not identified senior-led households as a separate customer group. Senior-led households that fall below the LICO (Low-Income Cut-Off) scale are included in the low-income program target marketing strategy.

Q32.5 Of the 16.5 percent or approximately 27,000 households under LICO how many are Senior-led?

A32.5 FortisBC has not identified senior-led households as a separate customer group.

Q32.6 Provide a copy/summary of the work prepared for FortisBC referenced on Page 62 following the Title Low Income Programs.

A32.6 A copy of the work prepared by FortisBC regarding Low-Income Programs is provided as Attachment BCOAPO A32.6.

1. MARKET CHARACTERIZATION – FORTISBC LOW-INCOME CUSTOMERS

According to the BC Progress Board Performance Indicator # 22 Low Income Cut-Offs (LICO) (Statistics Canada, 2006), approximately 16.5 percent of residential households in British Columbia qualify as low-income. While not a true poverty line, LICO does indicate the extent to which some Canadians are significantly worse off than the average Canadian. Based on the most recent figures from 2006, 16.6 percent of families and unattached individuals in British Columbia had incomes below the LICO (Table 1). Within the FortisBC service area that accounts for about 27,000 households.

	Community Size (Census Metropolitan Area)			
Household Size	**Rural**	**<30,000**	**30,000-99,999**	**100,000-499,999**
1 person	$14,596	$16,605	$18,147	$18,260
2 persons	$18,170	$20,671	$22,591	$22,731
3 persons	$22,338	$25,412	$27,773	$27,945
4 persons	$27,122	$30,855	$33,721	$33,930
5 persons	$30,760	$34,995	$38,245	$38,482
6 persons	$34,694	$39,469	$43,135	$43,402
7 or more persons	$38,626	$43,943	$48,024	$48,322

Table 1 BC LICO Statistics

The 2009 FortisBC End Use Survey (EUS) indicates that 12,560 households within the service area have total household incomes of less than $20K and a further 39,250 households have incomes between $20 and $40 K. This data suggests that the number of households considered to be low-income may be greater than reported in the Stats Can LICO report. Although, further analysis of the EUS report will provide more detailed descriptions of FortisBC's low-income customers, that detailed analysis was not completed prior to this report.

Quick Facts on FortisBC Customers that Rent

The majority of low-income customers are more likely to rent, live in apartments, heat with electricity and have a female or senior primary bill payer.1 The following summarizes some of the key characteristics specific to FortisBC's customers that rent (FortisBC EUS, 2009).

Characteristics of FortisBC Customers who Rent	**% of customers**
Renters	10%
Live in Central Okanagan	13%
Live in South Okanagan Similkameen	8%
Live in Kootenays	8%
Heat home with electricity	13%
Electric hot water	33%
Utility bills not included in rent	63%
Live in apartments or condos	35%
Live in duplexes or townhouses	18%
Live in mobile homes	8%

Table 2: Characteristics of Those Who Rent

2. BARRIERS TO ENERGY EFFICIENCY FOR LOW-INCOME CUSTOMERS

Low-income customers face significant barriers to participation in traditional DSM programs including limited disposable income and reduced motivation and ability to make retrofits due to a higher incidence of rental accommodation. In addition, traditional program delivery and marketing methods may be inappropriate for low-income households due to limited mobility/access, language barriers, and limited access to program information.2

Specifically, the key barriers to energy conservation within this customer group include:

- Affordability: limited disposable income

[1] In 2005, within the lowest income quintile in British Columbia, 88% had no full time earner, 37% were over 65 and 63% lived in rented property. The most extreme cases appear to be in small communities and rural areas.

[2] These barriers are supported by studies in the United States on long running low-income programs (Gaffney, K. 2006. "Assessing the Needs of California's Low-Income Population". *Proceedings of the 2006 ACEEE Summer Study on Energy Efficiency in Buildings*).

- Availability: limited mobility/access, transportation, uncertainty/concern to find and manage contractors, payment arrangements
- Awareness: product knowledge, program knowledge, language barriers
- Acceptance: not sure that benefits will materialize, too good to be true, fear of impact on other benefits
- Adoption: reduced ability to make changes in rental accommodation, time and convenience, tendency to move more often.
- Advocacy: limited tools and resources
- Structural barriers: grants and other incentives for energy efficiency improvements are usually directed at the landlord rather than the tenant who pays the utility bills (either directly or via their rent payments). In some cases, the landlord may fail to see the direct benefit from energy efficiency improvements to the building and lack the motivation to act.

The concepts of energy burden (defined as the proportion of household income spent on household energy use) and energy affordability (energy burden less than 10%) are increasingly important issues as the prices of fuels and utilities have risen steadily in many jurisdictions. Low-income households in British Columbia pay a disproportionate amount of their after tax income on energy. EAGA's statistical analysis shows that the 17.6% of after tax income spent on energy bills by the lowest income quintile is over three times the proportion that the typical household in British Columbia spends, and almost 6.5 times more than the highest income quintile spends.

3. LOW INCOME EFFICIENCY PROGRAMS IN OTHER JURISDICTIONS

The following best practices are summarized from Green Communities Canada's Proposed Framework for a National Low-Income Energy Efficiency program and are based on a comprehensive review of existing programs in Canada, the United States,

and the UK.3 These best practices are also supported by the American Council for an Energy Efficient Economy's 2005 Summary of Exemplary Utility Funded Low-Income Energy Efficiency Programs4 and Chartwell's 2007 Review of Low-income Energy Efficiency Programs.5

Low-income Energy Efficiency Programs – Summary of Best Practices:

- Comprehensive and holistic: Low-income programs tend to address multiple end uses and savings opportunities at the same time instead of one technology or end use.
- Fully facilitated instead of participant driven: The recommended service model is to offer 'fully facilitated' services, which means that the program generally takes care of the arrangements for the customer including booking appointments, arranging and paying for contractors, and coordinating funding.
- No costs: Programs and services are offered at no-cost to participating low-income customers. However, co-payments and in-kind contributions by property owners are recommended for rental properties (particularly MURB) including agreements around limiting rent increases.
- Eligibility requirements and other program elements are inclusive of all housing types, including mixed occupancy or mixed use buildings and are consistent with program target populations.
- Income criteria are simple and consistent with other low-income programs.
- Minimize participation barriers: Barriers are actively identified and minimized at all points in the program process.

[3] Green Communities Canada. 2006. *Proposed Framework for a National Low-Income Energy Efficiency Program for Canada*. Green Communities Canada, Peterborough, Ont, March 2006.
[4] Kushler, M., York, D. and P. Witte. 2005. Meeting Essential Needs: The Results of a National Search for Exemplary Utility Funded Low-Income Energy Efficiency Programs. American Council for an Energy Efficient Economy, Sept 2005. Report No. U053. Available Online at www.accee.org.
[5] Chartwell Inc. 2007. Low-Income Energy Efficiency Programs. Feb 2007.

- Delivery or partnership by non-profits and community organizations: Programs are often delivered by non profit and other community organizations.
- Coordinated/partnerships: Programs typically leverage funds and services from a variety of sources to maximize the value offered to participating customers.
- Contractor training is recognized as an essential and ongoing contributor to the program.
- Advanced Analytical and Tracking Approaches: Measure selections and installation is guided by cost effectiveness criteria and analysis/diagnostic testing instead of using prescriptive guidelines and artificial dollar value caps.
- Quality Assurance is recognized as essential and integrated into the program design including multiple checks for customer feedback, data integrity, and third party inspections to ensure installation and quality.
- Formal impact and process evaluations are used to identify opportunities for improvement and validate performance.

The following list provides a summary of the types of programs available in Canada and the US including the types of services offered. Although a variety of different programs are offered in the US and Canada, there are a number of characteristics that are common to almost all low-income energy efficiency programs, including:

- Most programs offer some combination of basic and more advanced energy efficiency measures.
- Programs vary in the depth and breadth of their services although the majority offer at least some extended retrofit measures to participants.
- The majority of programs offer fully facilitated programs including the direct installation of energy efficient products.

- Many offer services directly to renters, or as an alternative, allow landlords to apply on behalf of their tenants.
- The ‘participant driven’ service model is occasionally used in Canada (often for programs coordinated with the federal governments Residential Rehabilitation Assistance Program, which uses the same model). No examples of participant driven low-income energy efficiency programs were found among the programs reviewed from the United States.
- In Canada, many programs are aligned or partnered with federal and provincial retrofit programs that provide incentives for weatherization improvements.
- Most low-income programs in Canada have been in market less than three years.
- The average expenditure on measure costs per participant in Canada is approximately $2800 (includes programs that cover measures for gas heated homes).

In Canada, program providers include utilities, provincial government agencies and housing corporations.

Q32.7 What additional work has FortisBC done to identify and target senior-led households?

A32.7 FortisBC has not identified senior-led households as a separate customer group. Senior-led households that fall below the LICO (Low-Income Cut-Off) scale are included in the low-income program target marketing strategy.

Q32.8 Does FortisBC agree that DSM best practices include targeting "Hard to Reach" Customers, including Low Income Families and Senior-led Households? Please discuss this relative to the 2011 DSM Plan.

A32.8 Yes FortisBC agrees that DSM best practices do include targeting "hard to reach" customers, including low income families and senior-led households. FortisBC's plan to reach low-income and harder to reach households is to communicate primarily through low-income service providers and advocacy organizations. These agencies and their staff are more trusted by the low-income communities and therefore make communication and education easier and more effective. Communication channels include direct mail, flyers, personal telephone calls, face-to-face meetings and targeted advertising.

33.0 References: Exhibit B1, Appendix 3, Appendix D, pages 18-20, Figure 8 and Tables 1-3
Exhibit B1, Appendix 3, Figure 2.2.2 and Table 2.2.4

Q33.1 Using Table 1 as a base, provide an indication and breakdown of the range of residential average end uses for the 4 different residential archetypes including pre/post 1976 homes.

A33.1 Please see Table BCOAPO IR1 A33.1 below. Consumption data is not available for pre/post 1976 buildings since building age information is not stored in the FortisBC Customer Information System.

Table BCOAPO IR1 A33.1

Average Customer Use Comparison				
Building Type	**End-Use Model kWh**	**FortisBC Survey kWh**	**% Difference**	**Units/ Customers**
Single Family	**13,424**	**13,057**	**-2.81%**	**94,431**
Pre 1976	13,665	Not Available		37,036
Post 1976	13,283	Not Available		63,061
Mobile Home	**9,375**	**9,014**	**-4.01%**	**10,737**
Pre 1976	9,521	Not Available		2,874
Post 1976	9,326	Not Available		8,507
Apartment Condo	**5,913**	**5,109**	**-15.74%**	**17,620**
Pre 1976	5,913	Not Available		1,406
Post 1976	5,913	Not Available		17,271
Townhouse, Duplex, Row	**8,925**	**8,521**	**-4.74%**	**14,867**
Pre 1976	9,044	Not Available		2,515
Post 1976	8,903	Not Available		13,244
Total	**11,661**	**11,234**	**-3.80%**	**137,655**

Q33.2 Using Table 2 as a base, provide the historic growth rates 1990-2008 of the 4 archetypes.

A33.2 Historic growth rates are not available.

Q33.3 Using Table 3 as a base compare the forecast growth in energy consumption for each archetype

A33.3 Please see Table BCOAPO IR1 A33.3 below.

Table BCOAPO IR1 A33.3

Table 3 (Expanded) Residential Forecast Comparison - Energy						
FortisBC Load Forecast	**End-Use Model**	**Single Family**	**Manufactured Homes**	**Apartments and Condos**	**Row and Townhouses**	**% Difference**
MWh	**MWh**	**MWh**	**MWh**	**MWh**	**MWh**	
1,719,530	1,719,53	1,361,73	106,701	110,445	140,652	0.00%
1,745,793	1,744,63	1,373,48	108,454	118,819	143,876	-0.10%
1,772,466	1,771,65	1,388,84	109,270	128,380	145,160	0.00%
1,783,712	1,800,17	1,405,15	110,162	138,310	146,549	0.90%
1,807,542	1,822,25	1,418,47	110,953	145,098	147,729	0.80%
1,831,541	1,844,57	1,431,85	111,749	152,056	148,919	0.70%
1,855,710	1,866,48	1,444,77	112,513	159,131	150,069	0.60%
1,880,701	1,888,62	1,457,73	113,282	166,377	151,228	0.40%
1,906,346	1,910,98	1,470,73	114,058	173,797	152,398	0.20%
1,932,249	1,933,58	1,483,77	114,839	181,394	153,578	0.10%
1,957,970	1,956,40	1,496,84	115,626	189,171	154,768	-0.10%
1,983,400	1,979,47	1,509,94	116,420	197,132	155,969	-0.20%
2,008,728	2,002,76	1,523,08	117,219	205,279	157,182	-0.30%
2,034,028	2,026,30	1,536,26	118,025	213,618	158,405	-0.40%
2,059,050	2,050,08	1,549,46	118,837	222,150	159,639	-0.40%
2,083,634	2,074,10	1,562,68	119,655	230,879	160,884	-0.50%
2,107,779	2,098,37	1,575,94	120,480	239,809	162,140	-0.40%
2,131,534	2,122,88	1,589,22	121,311	248,943	163,408	-0.40%
2,154,780	2,147,65	1,602,52	122,149	258,285	164,688	-0.30%
2,177,513	2,172,66	1,615,85	122,994	267,840	165,979	-0.20%
2,199,772	2,197,98	1,629,30	123,845	277,559	167,282	-0.10%
2,221,489	2,223,75	1,643,17	124,530	287,447	168,601	0.10%
2,242,585	2,247,21	1,660,51	125,844	290,480	170,379	0.20%

Q33.4 Identify by comparing Figures 8 and 9, (and Exhibit B1 Appendix 3 Figure 2.2.3) those end uses that will experience

material increases in end use consumption from 2008-2030.

A33.4 Please refer to the response to BCUC IR No. 1 Q91.1.

Q33.5 Provide a tabular presentation of the strategies FortisBC will deploy to constrain growth in the energy use of end uses identified in the answer to part d).

A33.5 Please refer to BCUC IR No. 1 Q55.2 for a list of residential measures applicable to the major end-uses. Please also see the response BCUC IR No. 2 Q48.1.

Q33.6 Reconcile this to the Low and Medium CDM Program options in Table 2.2.4

A33.6 The Low and Medium DSM Program options were high-level extracts taken from an early CDPR draft available at the time. The 2011 DSM plan filed is a modified version of the Medium option based on the final CDPR report. A reconciliation of the differences is not possible since the 2011 DSM Plan is developed to a greater level of detail than Low and Medium options.

34.0 Reference: Exhibit B1, Appendix 3, Appendix D Page 113, Table 54

Q34.1 Given the identified potential for residential load control, discuss FortisBC's plans for such programs, including which loads are/will be controlled, incentives and participants.

A34.1 The AMI CPCN application to be filed in 2011 will discuss and quantify the potential for residential load control measures.

Q34.2 Compare to the Toronto Hydro Peaksaver programs. [https://www.peaksaver.com/]

A34.2 A review of the Peaksaver program indicates that the sole measure is an Air Conditioner control designed to mitigate summer peaking. This measure will be further discussed in the AMI CPCN application.

35.0 Reference: Exhibit B1, Appendix 3, Appendix D, page 62 -Fuel Switching

Q35.1 Why does the study only examine the potential for fuel switching for cooking and clothes drying, rather than water heating? Please explain why this latter application was not in scope.

A35.1 The CDPR scope included fuel switching measures that could impact the system peak load (Hour Ending 18:00), and where electricity dominated the appliance fuel (both electric stoves and dryers have ≥ 90 per cent penetration). Water heating did not meet those requirements. Consideration of fuel switching measures was discontinued subsequent to the Clean Energy Act (2010).

Q35.2 What studies has FortisBC done on the potential for fuel switching for water heaters? Please provide copies.

A35.2 FortisBC has not done any fuel switching studies regarding water heaters.

Q35.3 Is FortisBC aware of any such studies filed with the BCUC by BC Hydro and/or Terasen? Please provide references or copies

A35.3 FortisBC is not aware of any such studies.

36.0 References: Exhibit B1, Appendix 3, Appendix C, page 111 and Tables 53 & 60

Preamble

The achievability rates used in this study are based on BC Hydro's study and are shown in Table 53. The low achievability rates can be assumed if Time of Use (TOU) pricing structure is optional while the high achievability case can be assumed when TOU pricing is mandatory.

Q36.1 Provide a report or short summary of the current and planned status of Residential smart meter deployment and TOU pricing.

A36.1 FortisBC is currently working on a comprehensive application for a CPCN for its Advanced Metering Infrastructure (AMI) project, expected to be filed during 2011.

Over the last few months, project stakeholders have been defining detailed AMI requirements by documenting the planned uses of the AMI system. The team is currently working on the procurement processes necessary to select the most appropriate vendors based on the documented requirements and evaluation criteria which were defined by the project stakeholders.

Once the procurement process is complete, a CPCN application will be filed that contains:

- estimates on the costs, benefits and rate impacts of the AMI system;
- the results of utility collaboration discussions and stakeholder consultation;
- the results of a study on the possible costs and benefits of future programs that are supported by AMI technologies;

- a long term AMI Program Plan describing the functions and features that will be available day one as well as those that will be available and used in the future; and
- a conservation rate plan including the expected timing and impacts of those rates and of coordinated DSM opportunities.

Q36.2 Provide a version of Table 53 that shows the MWh and MW reductions (Summer/Winter) with/without mandatory TOU pricing.

A36.2 FortisBC has not completed the study that is expected to be included in the AMI CPCN application on the impact of TOU rates, nor has it performed the detailed rate design that would be required (following AMI implementation and the availability of time-based data) to estimate the effect of the those rates.

37.0 References: FortisBC 2011 CEP August 4 Workshop DSM Plan Presentation
Exhibit B1, Appendix 3

Preamble

Slide 4 and Appendix 3 list the principles on which the 2011 DSM Plan is based.

Q37.1 Discuss how the program applies DSM Best Practices in respect of "hard to reach" consumers:

a) Low Income Families
b) Renters
c) Seniors

A37.1 FortisBC is still in the planning stages of its low-income, renter and seniors programs. However, the best practices for designing effective programs for these hard to reach groups that will be followed are:

- review of relevant North American programs;
- participation in workshops and forums with "hard-to-reach" groups;
- involvement in organizations like the Green Landlords Advisory Committee and the Canadian Low-Income Program;
- identification of targeted groups selection of most effective communication channels to increase program reach;
- targeted education and communication strategies; and
- minimizing capital requirements from participants.

Q37.2 Provide the budgets and % of the total and residential budgets targeted to each of the above groups for the years 2008 to 2011 inclusive.

A37.2 The above groups are all eligible for the Low Income program to the extent they are low income customers. There is no breakdown of the budget between the groups.

Q37.3 Based on the <u>demographics</u> of FortisBC's "hard to reach" consumers, provide the amount and % of the Residential budget for 2011 that would/should be targeted to the above groups.

A37.3 Please see the response to BCOAPO IR No. 1 Q37.2 above.

38.0 References FortisBC 2011 CEP Exhibit B1 Page 73 Table 7.2
BCUC IR#1.55.2 Attachment

Q38.1 The first reference shows a 2011 Residential Sector Program gross utility cost of $3,636,000, savings of 16,422 MWh and a TRC C/B of 1.8. The second shows a Total cost of $89,215,111, a TRC C/B of 1.9. Please reconcile these costs and C/B ratios.

A38.1 The Benefit/Cost ratios were updated in Errata 2 (Exhibit B-1-2) dated August 26, 2010. FortisBC cannot find the $89,215,111 figure and assumes the question meant to reference the Total Cost figure of $11,892,151. The Total [Resource] Cost figure shown is the sum of the Utility cost (incentives + program admin) and the Customer cost.

Q38.2 Using BCUC IR! 55.2 Attachment as a base, provide a version that for each residential measure listed, add the following data

a) Freeridership
b) 2011 kWh savings (Unit kWh savingsx#units)
c) Utility Cost
d) Participant Cost.

A38.2 Table BCOAPO IR1 A38.2 provided below includes the requested data with the exception of freeridership. Please also refer to the response to BCUC IR No. 2 Q33.2.1 regarding free ridership.

Table BCOAPO IR1 A38.2

Sector	Program	Measure	Unit Measure Savings (kWh)	Utility Cost ($/unit)	Participant Cost ($/unit)	Unit Cost ($/Unit)	EML (years)	Unit Benefit ($/unit)	No. Units	Total Savings (kWh)	Total Cost ($)	Total Benefit ($)	Measure TRC B/C ratio
Residential													
	Bldg Envelope	Insulation R0 base	2.3	0.61	0.88	1.49	25	3.75	359,649	820,000	534,628	1,348,011	2.5
		R19 base	1.6	0.32	0.36	0.68	30	2.70	910,256	1,420,000	621,603	2,461,852	4.0
		Draftproofing - SFD	1,074	350	600	950	25	1,766	158	170,000	150,401	279,466	1.9
		Windows - single	23	6.10	18.35	24.45	20	34.0	57,778	1,300,000	1,412,740	1,965,593	1.4
		- dual	15	3.18	20.90	24.08	20	21.9	73,793	1,070,000	1,776,752	1,617,834	0.9
		T-stats	469	122	135	257	15	618	1,045	490,000	268,417	645,898	2.4
		furnace fan	109	55	90	145	20	165	1,743	190,000	252,914	287,279	1.1
	sub-total		$(000)s ->	**$ 1,378**					(MWh) ->	**5,460**	5,017,454	8,605,933	**1.7**
	Ht Pumps	AS-conversion	6,276	893	7,476	8,369	20	9,489	252	1,580,000	2,106,977	2,388,952	1.1
		AS-upgrade	3,036	742	1,116	1,859	20	4,590	181	550,000	336,748	831,597	2.5
		AS-ductless	4,000	787	4,165	4,953	20	6,048	109	435,000	538,627	657,718	1.2
		Geo	10,014	2,968	7,911	10,880	30	17,361	83	832,000	903,941	1,442,437	1.6
	sub-total		$(000)s ->	**$ 692**					(MWh) ->	**3,397**	3,886,293	5,320,704	**1.4**
	New Home	whole house - EG80	3,455	1,661	1,700	3,361	30	5,990	26	90,000	87,562	156,033	1.8
		- EG90	7,357	5,344	15,000	20,344	30	12,755	2	15,000	41,478	26,005	0.6
	sub-total		$(000)s ->	**$ 54**					(MWh) ->	**105**	129,041	182,038	**1.4**
	Lighting	CFL screw-in	35	4	4	8	5	21.5	63,714	2,230,000	499,220	1,371,176	2.7
		hard-wired	71	13	17	30	15	93.6	3,521	250,000	106,751	329,540	3.1
		T8 upgrade	29	4	15	19	15	38.2	32,414	940,000	627,368	1,239,070	2.0
	sub-total		$(000)s ->	**$ 438**					(MWh) ->	**3,420**	1,233,339	2,939,787	**2.4**
	Appliances	Clothes Washer	173	58	310	368	14	1,228	1,156	200,000	425,530	1,419,240	3.3
		Refrigerator	75	54	-	54	20	113	2,000	150,000	107,008	226,799	2.1
		P/U	840	89	90	179	5	516	214	180,000	38,410	110,678	2.9
		Freezer	54	53	-	53	20	82	741	40,000	38,906	60,480	1.6
		P/U	755	85	90	175	5	464	146	110,000	25,537	67,637	2.6
	sub-total		$(000)s ->	**$ 245**					(MWh) ->	**680**	635,391	1,884,834	**3.0**
	Electronics	Electronics	176	47	- 18	29	8	156	908	160,000	26,536	141,597	5.3
		Computers etc.	136	40	- 3	37	5	84	147	20,000	5,512	12,298	2.2
	sub-total		$(000)s ->	**$ 48**					(MWh) ->	**180**	32,048	153,895	**4.8**
	Wtr Heating	HPWH	2,001	593	201	794	15	2,638	90	180,000	71,469	237,269	3.3
		Other (watersavers)	407	44	-	44	10	421	1,572	640,000	69,215	661,346	9.6
		Solar Thermal	2,200	603	5,423	6,026	20	3,326	64	140,000	383,459	211,679	0.6
	sub-total		$(000)s ->	**$ 161**					(MWh) ->	**960**	524,143	1,110,294	**2.1**
	Low Income	ESK + installs	239	60	-	60	5	147	1,400	334,600	84,000	205,738	2.4
		Lite retrofit	1,371	1,475	-	1,475	13	1,669	150	205,650	221,250	250,313	1.1
	sub-total		$(000)s ->	**$ 305**					(MWh) ->	**540**	305,250	456,051	**1.5**
	Behavioural	clotheslines	225	15	-	15	7	180	10,000	918,000	150,000	1,804,007	12.0
		Other	50	11	-	11	3	19.8	15,200	760,000	160,000	301,623	1.9
	sub-total		$(000)s ->	**$ 310**					(MWh) ->	**1,678**	310,000	2,105,631	**6.8**
	Total Residential Sector			**$ 3,631**						**16,420**	**$ 12,072,958**	**$ 22,759,166**	**1.9**

Q38.3 Reconcile the numbers as required to those in Exhibit B1 Page 73 Table 7.2

A38.3 There is a small difference (0.1 per cent) in the Total Utility Cost, due to rounding. The Benefit/Cost ratio of the Low Income program should read 1.5. The correction to Table 7.2 is provided in Errata No. 3.

39.0 Reference: Exhibit B1, Appendix 3, page 29 - Low Income Program

Q39.1 Provide the eligibility criteria for the Low Income ESK hand-out and for the free installation program.

A39.1 The eligibility criteria are based on Statistics Canada LICO (Low-Income Cut-Off) scale.

Q39.2 Provide details of the screening of Applicants for the ESK and free installation program(s).

A39.2 There are two screening processes:

1) Contact Centre staff telephone applicants and ask their income and assess eligibility based on the LICO scale. No income verification is required.

2) Low-Income service providers that apply for "bulk" orders of ESKs for large-scale installations (i.e., social housing organizations) sign a statement declaring their clients' incomes fall below the LICO Scale. No income verification is required.

   Note: When future higher-value measures are implemented (for example, installation of ESKs) income verification will be required.

Q39.3 Why are Senior-led households not eligible for ESKs and free installation, given the barriers to self-installation?

A39.3 As there are many senior-led households in the FortisBC service area that do not fall below the LICO scale, this specific age-group has not been targeted for the measures. FortisBC is working with several low-income service providers that do target low-income senior-led households and those customers have access to the program.

Q39.4 Why is FortisBC not providing programmable thermostats as part of the Low-income program?

A39.4 The 2010 CDPR considered, but did not model, Programmable Thermostats since the measure has a poor TRC benefit-cost ratio resulting from small energy savings.

Q39.5 What are the constraints on the distribution and installation of ESKs? Why are 2000 and 400 homes respectively an appropriate target? Explain why a higher target for 2011 is not possible.

A39.5 The target of 2000 ESKs is incorrect, and should read 1,400 ESKs of which installs for 400 homes will be provided.

This is based on the participation rate of the BC Hydro ESK program. FortisBC believes this is a prudent goal given the overall size of the DSM program and the resources the Company has available. Please also refer to Errata 3.

Q39.6 Provide the eligibility/screening criteria for ECAP.

A39.6 FortisBC, Terasen Gas and BC Hydro intend to collaboratively deliver a consistent ECAP program throughout British Columbia. Eligibility screening is based on the LICO scale (verification is required) and an annual energy consumption greater than 8,000 kWh per year.

Q39.7 Provide the details of the ECAP Audit, list of eligible measures, the incentive(s) provided, and the estimated participant and utility costs of these measures.

A39.7 Details of the program are listed on BC Hydro's webpage http://www.bchydro.com/powersmart/residential/ps_low_income/energy_conservation.html

Energy saving products that may be installed include:

- Energy saving light bulbs (CFLs) indoor and outdoor
- Faucet aerators for the kitchen and bathroom
- Low-flow showerhead
- Water heater pipe wrap and blanket
- Draftproofing, such as weatherstripping, caulking and outlet gaskets
- Insulation for attics, walls and crawlspaces
- Low-wattage night light
- Energy Star® refrigerator

Q39.8 Why is a target of 150 homes appropriate? What are the constraints to increasing this given the obvious need? Please explain in detail.

A39.8 FortisBC believes the target is appropriate given the overall size of the DSM program and the resources the Company has available.

40.0 Reference: Exhibit B1, Appendix 3, page 29 - Rental Accommodation Programs Single and Multi-Family

Q40.1 Provide the eligibility criteria for the Rental ESK hand-out and for the free installation program.

A40.1 Please see the response to BCOAPO IR1 A39.1.

Q40.2 Provide details of the screening of Applicants for the Rental ESK and free installation program(s).

A40.2 Please see the response to BCOAPO IR1 A39.2.

Q40.3 What are the constraints on the distribution and installation of ESKs to renters? Explain why a higher target for 2011 is not possible.

A40.3 Distribution and installation criteria are the same as those for owner occupied households. FortisBC believes the target is appropriate given the overall size of the DSM program and the resources the Company has available.

Q40.4 Why are Senior-led rental households not eligible for ESKs and free installation given the barriers to self-installation?

A40.4 Please see the response to BCOAPO IR1 A39.3.

41.0 Reference: Exhibit B1, Appendix 3, page 30 - Rental Accommodation Programs Single and Multi-Family

Preamble

In its second phase, to be introduced in mid-2011, the Company in collaboration with Terasen Gas and BC Hydro, will direct-market financial incentive offers to landlords, property managers and rental agencies to upgrade rental properties. Similar to the LiveSmart collaborative program, a suite of "whole home" rebates and incentives for energy building evaluations will be offered. Additional information collateral that target renters directly will also be provided to help inform landlords and renters.

Q41.1 Is FortisBC targeting Social/Assisted MURBs or market rate Rental Units (or both)? Describe the markets and strategies in more detail.

A41.1 Yes, FortisBC is targeting social assisted multiple-unit residential buildings (MURBs) and rental units and is using the BC Housing Registry as a channel to reach this sector. In addition to direct mail and phone calls, field representatives have been meeting with some organizations to discuss the program and its benefits in detail.

Q41.2 What provision(s) is FortisBC (and partners) making to address the "split incentive" i.e. what is to prevent landlords from charging higher rents rather than passing the savings on to renters.

A41.2 FortisBC cannot ensure that landlords will pass on savings to renters, but expects that government regulation and the competitive rental marketplace will mitigate the "split incentive" effect.

Q41.3 Provide a preliminary report on the lessons learned from the 2010 pilot program

A41.3 It is too early to report back as the pilot is only just underway.

42.0 Reference: Exhibit B1, Appendix 3, page 30-31 - Improved Efficiencies Preamble

Q42.1 For collaborative programs with the BC Ministry of Energy, Mines and Petroleum Resources, BC Hydro and Terasen provide complete details of the attribution rules that will apply to each program.

A42.1 Please see the response to BCOAPO IR No. 1 Q28.1.

Q42.2 Provide a version of Table 3.4.1 that shows the historic 2008 and 2009 data and provides the breakdown of costs of program delivery per participant and per kWh saved

A42.2 Table 3.4.1 is restated below (Table BCOAPO IR1 A42.2a and 42.2b) to include historic (2008-9 actuals), and to provide a unit cost breakdown in cents per kWh saved. A cost breakdown per participant is not provided as the numbers would not be accurate. Certain programs that are delivered in bulk such as CFL and clothesline giveaways, product incentives delivered through electrical product wholesalers and collaborative LiveSmartBC programs do not provide transparency in terms of number of participants.

Table BCOAPO IR1 A42.2a
Program Delivery Costs as a Percentage of Total Budget

Budget Allocation	2008	2009	2010	2011
	Actual		Approved	Plan
Incentives	49%	50%	50%	63%
Program Administration	34%	34%	31%	19%
Conservation Culture	0%	4%	4%	3%
Community Energy Planning	0%	0%	0%	3%
Trades training	0%	0%	0%	1%
Education	1%	0%	2%	2%
Planning & Evaluation	16%	12%	13%	10%

Table BCOAPO IR1 A42.2b
Unit Cost (¢ per kWh saved)

Budget Category	2008	2009	2010	2011
	¢ per kWh saved			
	Actual	Approved		Plan
Incentives	4.8	6.1	7.2	12.4
Program Administration	3.4	4.2	4.5	3.7
Conservation Culture		0.5	0.5	0.5
Community Energy Planning				0.6
Trades training				0.3
Education	0.1		0.2	0.4
Planning & Evaluation	1.5	1.4	1.9	1.9
Total DSM	9.8	12.2	14.4	19.7

FORTISBC

POWERHOUSE WINDOWS ASSESSMENT REPORT

For

Lower Bonnington (P1)
Upper Bonnington (P2)
South Slocan (P3)
Corra Linn (P4)

JUNE 2009

PREPARED BY:

Redwood engineering ltd.
3120 HIGHWAY DRIVE
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Final

APPROVALS

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Signature: _____ Date: Sept. 8/09.

Don Norman P.Eng, Civil/Structural Engineering Manager
Redwood Engineering Ltd.

Signature: _____ Date: 8 Sept 2009

Larry Staecey AScT
Generation Planner / Sr. Mechanical Designer
AMEC (ForticBC Representative)

Signature: L D Staecey Date: 4 Sept 2009

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EXECUTIVE SUMMARY

This report is the result of Larry Staecey, representing FortisBC, contacting Redwood Engineering of Trail, British Columbia to request an inspection of the existing powerhouse windows located in the powerhouses at Lower Bonnington (P1), Upper Bonnington (P2), South Slocan (P3), and at Corra Linn (P4). This assessment report includes a baseline cursory visual inspection of the powerhouse windows as defined in ForticBC's Request for Quotation (compiled by Larry Staecey, dated April 15, 2009). The inspection was carried out in June, 2009.

The original windows installed in the P1 to P4 power plants are of different vintages and manufacturers. The window technology used in later years on the more recently-built powerhouses progressed with better quality hardware and installation (see Table 1, Powerhouse Photo Comparison on page 3). The existing windows are made up of a steel-framed sash with individual ¼" georgian wire-glass panes, installed within a steel-framed mounting angle mechanically fastened to the window jamb and header openings (the exception to this is P1, Lower Bonnington, where the sashes have been mechanically fastened to the face of window stops that have been formed in place within the openings).

The P1 powerhouse windows are among the oldest existing windows that were inspected and the original window putty has since dried out and deteriorated to the extent of falling off in substantial pieces, most notably from bottom window pane areas caused by the ventilating sashes slamming into the windows (see pictures 4 & 5). As well, some window operators have been retrofitted with rope in lieu of chain pulls. A sampling of the operation of some of these windows revealed that the rope tends to stretch as the windows are opened and closed, making it more difficult to control the movement of the ventilating sashes. Some windows exhibited rough operation due to sloppy or loose hinges too, either caused by worn-out hinges or modified hinges using nuts and bolts in lieu of hinge pins and tie-wire used in lieu of cotter-pins. The hinge pins not observable with deficiencies could not be verified due to being concealed by the hinge barrels. A majority of the windows have cracked glass panes but are still intact due to the wire-glass which is holding the broken pieces together within each pane. The balance of the powerhouses were found to have less concerns to some degree with localized window locations only that require attention due to some or all of the issues listed above.

From a window performance standpoint, the windows have stood up very well over the years, with the service life of the windows between the powerhouses reaching between 69 to 83 years, which is unheard of today. From a safety standpoint, the inherent design of the windows using ¼" georgian wireglass held in place with glazing clips and window putty should prevent any glass from falling onto workers below. Any cracked glass panes are being held intact due to the georgian wireglass and the glazing clips are holding the glass panes in the sashes with the window putty providing a seal (the exception to this is P1 Powerhouse, where there is concern for operator glass panes that have significant putty loss and require immediate attention). From a design standpoint, the window ventilating operators are cumbersome and tricky to use and the original windows do not have screens built in to keep birds and insects out. A small % of windows on each powerhouse have been retrofitted with exterior screen cages as a result.

As a result of the inspection findings, the recommended options are summarized as follows:

- **Option 1(a)** - Instigate a comprehensive window-repair program immediately for all windows to extend window life-span up to 25 years. Work includes removing existing window sashes from the frames on the interior side of the powerhouse and rework them, including replacing broken glazing and removing and installing new window putty to all lites and reinstalling sashes in existing window frames. Replace missing chain pulls and replace existing rope pulls with chain pulls, rebuild worn out hinges and patch /repair exterior sills where cracked and caulk around all exterior window frames. All operator windows are recommended to be prioritized for rework as they are in the worst condition.

- **Option 1(b)** – Provide maintenance repair work to existing windows to extend window life-span 5 years or more on windows indentified by owner. Scope of work is based on individual window inspection results for each plant that includes removing existing window sashes from the frames on the interior side of the powerhouse and complete repairs to them. Repairs include replacing broken glazing as required and removing and installing new window putty to all lites on windows

identified as having 'window putty severely cracked with pieces falling away', install new chain pulls where they are missing and replace existing rope pulls with chain pulls, replace hinge pins and tighten or replace missing wall fasteners where indicated.

Remove a random sampling of remaining operator-sashes from each elevation and inspect condition of original hinge-pins not identified in inspection data sheets (the original hinge pins not identified as being modified or in obvious need of repair are not readily available for visual inspection due to being concealed). Monitor and reinspect remaining windows within 5 years to determine priority of reworking remaining windows.

- **Option 2(a)** – Instigate a replacement window program immediately with Jeldwin PVC thermal windows, as used on P2 – Upper Bonnington. This option includes removing existing window sashes and window mounting frames on the interior side of the powerhouses and disposing of them off site. All operator windows are recommended to be prioritized for rework as they are in the worst condition. Patch / repair exterior sills where cracked as the windows are removed from the interior-side of the powerhouses.

- **Option 2(b)** - Instigate a replacement window program immediately with Kalwall thermal windows (refer to attached documentation). This option includes removing existing window sashes and window mounting frames on the interior side of the powerhouses and disposing of them off site. All operator windows are recommended to be prioritized for rework as they are in the worst condition. Patch / repair exterior sills where cracked as the windows are removed from the interior-side of the powerhouses.

Recommended options for each powerhouse are summarized below with associated costings:

Lower Bonnington (P1):	
• Option 1(a) - Instigate a comprehensive window-repair program immediately for all windows.	$ 590,635.74
• Option 2(a) – Instigate a replacement window program immediately with Jeldwin PVC thermal windows.	$ 628,381.35
• Option 2(b) - Instigate a replacement window program immediately with Kalwall thermal windows.	$ 716,561.22
Upper Bonnington (P2):	
• Option 1(b) – Provide maintenance repair work to existing windows to extend window life-span on windows indentified by owner.	$ 45,243.05
South Slocan (P3):	
• Option 1(b) – Provide maintenance repair work to existing windows to extend window life-span on windows indentified by owner.	$ 103,324.24
Corra Linn (P4):	
• Option 1(b) – Provide maintenance repair work to existing windows to extend window life-span on windows indentified by owner.	$ 106,138.56

TABLE 1: Powerhouse Photo Comparison

	P1 LOWER BONNINGTON	P2 UPPER BONNINGTON	P3 SOUTH SLOCAN	P4 CORRA LINN
HINGE STYLE				
INTERIOR VIEW				
EXTERIOR VIEW				
POWERHOUSE INTERIOR				

1.0 Introduction

The purpose of the inspection was to visually appraise the condition of the powerhouse windows in their present form and provide a windows assessment report, including recommendations and conceptual budget cost estimates for recommendations for each powerhouse. The inspection is supported as appropriate by tabulated inspection results and photographs. The inspection was limited to powerhouse windows only; switch room, office, stairwell and washroom windows located within the powerhouses were not inspected and are excluded from this report. No excavations, removal of coatings or toppings was undertaken. No coring or sampling of concrete was implemented. Testing of structural members, structural analysis, or assessment of the existing structure to sustain design loads as prescribed by modern codes is beyond the scope of this inspection and report. Redwood Engineering believes the level of observation and reportage in this inspection is appropriate. Redwood Engineering cannot be held responsible for identifying or assessing elements inaccessible or deterioration not detectable by visual inspection.

2.0 Background & History

2.1 Existing Windows:

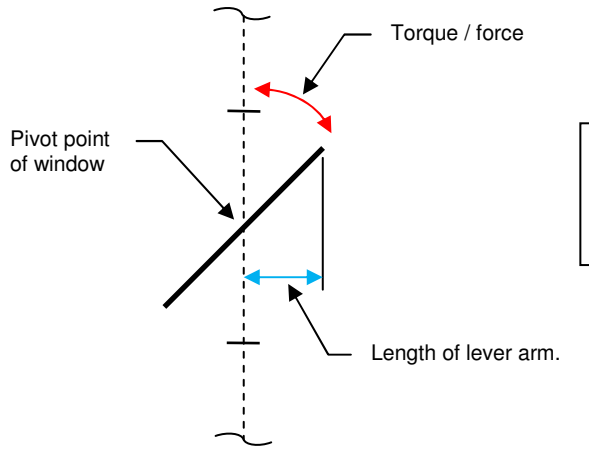
The windows installed in the P1 to P4 powerhouses are all original with the exception of Upper Bonnington (P2 – old plant). Most of the original wood frame windows in the original P2 plant built in 1907 have been replaced recently with modern vinyl thermal units that have a single-hung operator sash on the window bottoms that slide up for ventilation. The balance of the powerhouse plants including the P2 1939 extension use a heavy-industrial steel frame window design. The steel frame windows are typically installed and through-bolted from the interior to a wall/header-mounted steel angle or to steel clips installed on the jambs and headers that were designed to provide a tight seal in the window opening. The window sill frames are grouted in place. No caulking or sealants were visible upon inspection, likely due to the vintage and design of the windows.

The power plants generally have 3 level of windows installed on the downstream sides of the power plants, 1 - 2 level of windows installed on the upstream sides of the power plants and 2 – 3 levels of windows on the river and track sides of the power plants, depending on location. The first 2 level of windows on the downstream sides of the power plants typically have two ventilating manually-operated sashes in each window that open and close by pivoting in the window frame using long chains pulled by hand from the floor level. The river sides of the power plants have similar pivoting ventilating sashes in the windows on all levels of windows. The hinges used on the pivoting ventilating sashes vary in design between the powerhouses based on the age of the windows. The older powerhouses use a simple hinge & pin system while powerhouses built later use surface-mounted exposed hinges and the most recent original windows use a concealed-pin hinge system. The original window glazing typically used is individual ¼" single-pane georgian wire safety-glass lights held in place with glazing clips and window putty on the interior side of the window sashes. Some of the power plant window lights have been painted white to help diffuse the sunlight entering into the powerhouses and to reduce the direct radiant heat from the sunlight. The original window designs do not allow for screens on the pivoting ventilating sashes and due to this, some of the windows have been retrofitted with exterior screen cages to allow the windows to pivot freely and to keep birds and insects out.

2.2 Safety Concern:

During the course of the window inspection, it was brought to Redwood's attention that there was a concern for workers safety when operating the ventilating windows, especially in the Lower Bonnington (P1) powerhouse. Due to time constraints, a small sampling of windows in the P1 powerhouse was chosen to test operation of the ventilating windows and it was found that due to the inherent design of the pivoting operating sash (no counterbalancing is used), the opening and closing operation proved to be difficult using the chain from the floor level. As the typical operating sash pivots to open or close, the amount of torque or force increases as the position of the sash approaches the closing position, creating for an uneven weight transfer that can be felt through the chain. If the chain is not grasped firmly or if the worker is not prepared for the weight transfer, the sash can have a tendency to slam back into the window upon closing (see Illustration 1 below).

ILLUSTRATION 1:



Cross-section of Typical Operator Window

2.3 Method of Inspection:

Window elevation drawings for P1 to P4 powerhouses were provided to Redwood Engineering by the owner for use to conduct the windows inspection (Note: Upper Bonnington (P2) drawings of the original plant built in 1907 were not provided to Redwood and have not been included in this report).

Window schedules were created by Redwood Engineering based on the owner-supplied drawings for the powerhouse windows and an alpha-numeric window identification system was produced for each powerhouse in order to keep track of and compile the inspection results.

A total of 5 days was spent to conduct on-site window inspections for the P1 to P4 powerhouses. The original scope of work limited on-site window inspections to 1 day / powerhouse but an extension was granted to Redwood by FortisBC to return to site on a 5th day in order for Redwood to obtain more comprehensive inspection results. Due to the time constraints, only a cursory visual inspection could be completed on each window.

A FortisBC representative was assigned to accompany Redwood Engineering's inspector at all times during the window inspections. Window inspections were conducted on the interior of the powerhouses visually from the ground floor for the lower level windows, and with use of the plant powerhouse cranes / manbasket and crane operator for the upper level interior windows. Window inspections were conducted on the exterior of the powerhouses visually from the ground level with use of binoculars.

Each window location was visually appraised and notable deficiencies were recorded and supported by photographs taken during the inspections. Sampling of window operation was conducted in each plant as time allowed.

Each window received a cursory visual inspection on the interior side for condition of:

a) Window Frame Perimeter / Sill
b) Window Frame Anchorage
c) Window Operator Sash Hinges / Pins
d) Window Coatings
e) Window Panes
f) Window Putty
g) Window Opening & Closing Device

Each window received a cursory visual inspection on the exterior side for condition of:

h) Window Frame Perimeter / Sill
i) Window Coatings

3.0 Inspection Results

3.1 Lower Bonnington (P1) (refer to Illustration 3, Inspection Summary P1 Powerhouse)

a) Window Frame Perimeter / Sill Condition (Interior):

The window frame perimeter on all the windows appear to be in good condition with tight seals against the jamb and header openings. The jamb and header areas of the window openings appear to be structurally sound and there appears to be some minor paint flaking away from some of the sill areas only. Instead of using steel mounting angle to install the windows as in the other power houses, window stops have been formed into the concrete jambs and headers of the openings and the windows are installed from the interior side. The sill portion of the steel window frames are sitting on top of the concrete sills with no caulking or sealants noticeable. 42% of the windows inspected were found to have small cracks appearing on and below the sill and wall areas of the windows. These small cracks are more likely caused by moisture infiltration through the bottom corners of the window frames. No caulking or sealants were visible on the interior.

b) Window Frame Anchorage Condition:

The window frame anchorage system on the P1 Powerhouse windows uses a different system of window installation from that of the other powerhouses. Instead of 'through-bolting' the window frames to the window mounting angles, the windows are fastened to the mounting angles by clips or washers in some cases, and nuts that "pinch" them to the perimeter mounting angle frames. Window 'N2' on the P1 Window Inspection Schedule has a missing frame fastener located on the bottom-left side of the window (see Picture # 8).

c) Window Operator Sash Hinges / Pins:

The window operator sash hinges and pins are of an exposed design with evidence of wear from cycling the operator sashes over the years and from overextending the travel of the windows when opening and closing them. Fifteen windows that were visually inspected were found to have either bent, loose-operating or repaired / modified pins. Some pins have been replaced with cotter-pins and some other pins have been replaced with bolts and nuts (see Pictures # 6, 10 & 11).

d) Window Coatings:

The windows in the P1 powerhouse have been painted white, including both glass panes and frames. Some of the windows are exhibiting signs of mild surface corrosion (ie. peeling paint), particularly on the 2nd and 3rd levels of the Upstream Side and River Side of P1 powerhouse but otherwise the steel frames and sashes are in good condition.

e) Window Panes: (refer to Illustration 2, % of Broken Glass in Windows, P1 Powerhouse)

The existing window panes are ¼" georgian wire-glass and as mentioned above are painted white to diffuse the light and reduce the radiant heat inside the powerhouse. 75% of the windows have cracked or broken glass panes or 22% of all individual glass panes in the powerhouse are cracked or broken. The glass is still intact due to the wire-glass which is holding the broken pieces together within each pane. There is only one window (Window 'N3') which has a smashed glass pane that is hanging from the window and was reported to the FortisBC representative to be replaced immediately (see picture # 5). On window, 'U1', it appears that two glass panes have been replaced.

f) Window Putty:

The window putty on all the windows located in the P1 Powerhouse has failed due to age and exposure over time to ultraviolet light. The putty was observed to be dried out throughout the powerhouse and severely cracked to the extent that significant pieces have fallen off the bottom sections of the operator window panes in localized areas. The condition of the window putty is typically worse on the river-side of the powerhouse (see picture #'s 4, 5). Note, where the putty has fallen away, no glazing clips were visible during inspection.

g) Window Opening & Closing Devices:

Out of the 39 windows that have ventilating operators in the P1 powerhouse, it was observed that 6 windows have missing chains / hardware and another 19 windows have had the existing chains replaced with rope. Some of the chains and rope are tied back to cable trays or anything else nearby rather than using appropriate window tie-downs (see picture # 12).

h) Window Frame Perimeter / Sill (Exterior):

The window frame perimeter on all the windows appears to be in good condition with tight seals against the jamb and header openings. The jamb and header areas of the window openings appear to be structurally sound and there appears to be evidence of spalled concrete on the exterior sills typically on the first level of windows on the down-stream side of the powerhouse. The spalled concrete sills are caused by moisture infiltration through the bottom of the window frames.

No caulking or sealants were visible on the exterior perimeter except for those localized areas on the first level of windows on the exterior side where spalled concrete sills have been patched. It is evident the patching is failing where it has been applied (See pictures 9 and 18).

Exterior metal cages have been installed to ten 2nd level windows on the downstream side to provide protection against birds and insects from entering the powerhouse while the windows are open.

i) Window Coatings (Exterior):

The window coatings on the exterior appear to be in good condition.

Redwood engineering ltd.

Lower Bonnington (P1) Window Inspection

			INTERIOR INSPECTION							EXTERIOR INSPECTION		
			A	B	C	D	E	F	G	H	I	J
	Window Location	Type	(No. of lites)	# Cracked / Broken Glass Panes	Glazing Putty Condition(no caulking used)	Window Hinges / pins on operators	Window Coatings	Window Frame Anchorage in concrete wall	Window Opening & Closing Device condition	Window Frame Perimeter / Sills	Exterior Condition	Metal Cage Installed	Window Description / Other
													Window frame is lightly corroded.
	R2	2	30	6	2	0	3, 11	0	0	7	0	NO	(7) wall has small cracks bottom left & right of window.
	O2	2	30	12	2	0	3, 11	0	0	7	0	NO	(7) wall has small cracks bottom left & right of window.
	P2	2	30	4	2	0	3, 11	0	0	7	0	NO	(7) wall has small cracks bottom left & right of window.
	O2	2	30	2	2	0	3, 11	0	0	7	0	NO	Conduit is running through window frame to exterior (7) wall has small cracks bottom left & right of window.
	N2	2	30	15	2	0	3, 11	9	0	7	0	NO	(2) Window pane is broken through and coming away; glazing clips failed and not holding window in place. This situation is apparent on bottom panes of operator sashes. (7) wall has small crack bottom left of window. (9) some missing sash mounting nuts; sash not through-bolted but instead pinched with washers/nuts on mounting frame.
	U2	2	30	18	2	0	3, 11	0	5	0	0	NO	(5) window operator sash 'flipped' around from wind. (9) some missing sash mounting nuts; sash not through-bolted but instead pinched with washers/nuts on mounting frame.
	T2	2	30	15	2	0	3, 11	0	5	0	0	NO	(9) some missing sash mounting nuts; sash not through-bolted but instead pinched with washers/nuts on mounting frame.
	S2	2	30	11	2	0	3, 11	0	4, 5	0	0	NO	(9) some missing sash mounting nuts; sash not through-bolted but instead pinched with washers/nuts on mounting frame.
	M2	2	30	9	2	0	11	0	5	7	0	YES	
	L2	2	30	7	2	0	11	0	0	0	0	NO	Chains have been replaced. Window has high-voltage lines running through it and is partially covered with sheetmetal.
	K2	2	30	9	2	0	11	0	5	7	7	YES	(7) interior & exterior wall has small cracks bottom left & right of window.
	J2	2	30	10	2	0	11	0	5	7	0	YES	(7) wall has small cracks bottom left & right of window.
	I2	2	30	2	2	0	11	0	5	0	0	NO	Window has high-voltage lines running through it and is partially covered with sheetmetal. Sill/Wall at bottom left & right of window has been patched.
	H2	2	30	3	2	0	11	0	0	0	0	YES	Chains have been replaced.
	A2	2	30	3	2	0	11	0	0	0	0	YES	(7) wall has small cracks bottom right of window.
	B2	2	30	0	2	0	11	0	0	7	7	YES	(7) interior & Exterior wall has small cracks bottom right of window.
	C2	2	30	2	2	0	11	0	0	0	0	YES	Chains have been replaced.
	D2	2	30	6	2	0	11	0	5	0	0	YES	
	E2	2	30	2	2	0	11	0	4	0	0	YES	(4) missing chain on bottom operator; newer chain installed on top operator.
	F2	2	30	1	2	0	11	0	4	0	0	NO	Window has high-voltage lines running through it and is partially covered with sheetmetal. Sill/Wall at bottom left & right of window has been patched. (4) missing chain on bottom operator; newer chain installed on top operator.
	G2	2	30	6	2	0	11	0	0	0	0	YES	
	A3	3	15	0	2	0	11	0	0	0	0	NO	
	B3	3	15	0	2	0	11	0	0	7	0	NO	(7) wall has small cracks bottom left & right of window.
	C3	3	15	1	2	0	11	0	0	7	0	NO	(7) wall has small cracks bottom right of window.
	D3	3	15	0	2	0	11	0	0	7	0	NO	(7) appears there is an angle mounted to inside edge of sill with concrete covering coming away.
	E3	3	15	0	2	0	11	0	0	7	0	NO	(7) wall has small cracks bottom right of window.
	F3	3	15	0	2	0	11	0	0	0	0	NO	
	G3	3	15	0	2	0	11	0	0	0	0	NO	
	H3	3	15	0	2	0	11	0	0	0	0	NO	
	I3	3	15	0	2	0	11	0	0	0	0	NO	
	J3	3	15	0	2	0	11	0	0	0	0	NO	
	K3	3	15	0	2	0	11	0	0	0	0	NO	
	L3	3	15	0	2	0	11	0	0	0	0	NO	
	M3	3	15	0	2	0	11	0	0	0	0	NO	
	S3	3	15	5	2	0	3, 11	0	5	7	0	NO	Upper windows on river side reportedly tend to "flip" over easy in heavy winds. Windows opened from overhead crane. (7) wall has small cracks bottom of window.
	T3	3	15	5	2	0	3, 11	0	4	7	0	NO	Upper windows on river side reportedly tend to "flip" over easy in heavy winds. Windows opened from overhead crane. (7) wall has small cracks bottom of window.
	U3	3	15	7	2	0	3, 11	0	0	7	0	NO	Upper windows on river side reportedly tend to "flip" over easy in heavy winds. Windows opened from overhead crane. (7) wall has small cracks bottom of window.

Legend:

0 - Appears O.K. or Item N/A due to window style or other
1 - Glazing putty cracked
2 - Glazing putty severely cracked with pieces falling away
3 - Corroded frame/sash
4 - Missing chains/hardware
5 - Rope used in lieu of chain
6 - Replace hinge pins
7 - Crack in wall due to moisture infiltration
8 - Gap between frame and wall jamb
9 - Loose or missing wall fasteners
10 - Frame/sash painted only
11 - Glass panes painted white

Redwood engineering ltd.

Lower Bonnington (P1) Window Inspection

				INTERIOR INSPECTION						EXTERIOR INSPECTION		
				A	B	C	D	E	F	G	H	I	J
	Window Location	Type	(No. of lites)	# Cracked / Broken Glass Panes	Glazing Putty Condition(no caulking used)	Window Hinges / pins on operators	Window Coatings	Window Frame Anchorage in concrete wall	Window Opening & Closing Device condition	Window Frame Perimeter / Sills	Exterior Condition	Metal Cage Installed	Window Description / Other
44	N3	3	15	8	2	0	3, 11	0	0	7	0	NO	(7) wall has small cracks bottom left & right of window.
45	O3	3	15	7	2	0	3, 11	0	0	7	0	NO	(7) wall has small cracks bottom right of window.
46	P3	3	15	7	2	0	3, 11	0	0	7	0	NO	(7) wall has small cracks bottom right of window.
47	Q3	3	15	5	2	0	3, 11	0	0	7	0	NO	(7) wall has small cracks bottom right of window.
48	R3	3	15	4	2	0	3, 11	0	0	7	0	NO	(7) wall has small cracks bottom right of window.
49	B1	1	35	7	2	6	11	0	5	0	0	NO	(5) Two ropes used in lieu of chain operation. (6) wire used in lieu of cotter-pin in hinge.
50	C1	4	35	0	3	6	11	0	4, 5	0	0	NO	(5) One rope used in lieu of chain. (6) hinge pins appear to be loose/sloppy in operation.
51	D1	1	35	2	2	6	11	0	4	0	7	NO	(6) wire used in lieu of cotter-pin in hinge. (7) Bottom left sill corner has crack and sill has been patched but is starting to spall again.
52	E1	1	35	4	2	6	11	0	5	0	7	NO	(6) pins appear to be missing but window pane is still operational. (7) Bottom left sill corner has been patched but is starting to spall again.
53	F1	1	35	8	2	6	11	0	5	0	0	NO	Window pane has been replaced. Exterior sill has been patched. (6) Window has electrical duct bank in front and window operators not used.
54	G1	1	35	14	2	6	11	0	0	0	0	NO	Chain replaced. Exterior sill has been patched. (6) Hinge pins are bent and appear to be loose, some installed reverse.
55	H1	1	35	10	2	6	11	0	0	0	7	NO	Chain replaced; extra chain attached to top of operator sash to prevent window from "flipping" in heavy wind. (6) Hinge pins appear to installed reversed. (7) Exterior sill is spalled with exposed rebar.
56	I1	1	35	15	2	6	11	0	0	0	0	NO	Exterior sill has been patched. (6) window is concealed by electrical duct bank in front and window operators not used.
57	J1	1	35	9	2	6	11	0	5	0	7	NO	Extra chain attached to top of operator sash to prevent window from "flipping" in heavy wind. (6) Hinge pins appear to installed reversed. (7) Exterior has been patched but is spalled in areas.
58	K1	1	35	9	2	6	11	0	5	0	7	NO	Extra chain attached to top of operator sash to prevent window from "flipping" in heavy wind. (6) Hinge pins appear to be installed reversed and bottom left hinge pin replaced with nut and bolt and is sloppy/loose. (7) Exterior has been patched but is spalled in areas. Interior side has small crack on wall, bottom left.
59	L1	1	35	8	2	6	11	0	5	7	7	NO	Extra chain attached to top of operator sash to prevent window from "flipping" in heavy wind. (6) Hinge pins are bent and appear to be loose, some installed reverse. (7) Exterior has been patched but is spalled in areas. Interior side has small crack on wall, bottom left.
60	M1	1	35	12	2	6	11	0	5	7	0	NO	Extra chain attached to top of operator sash to prevent window from "flipping" in heavy wind. (6) Hinge pins are bent and appear to be loose, some installed reverse. Interior side has small crack on wall, bottom right.
61	S1	1	35	16	2	6	11	0	5	0	0	NO	(6) Hinge pins appear to installed reversed.
62	T1	1	35	13	2	6	11	0	0	0	0	NO	(6) Hinge pins appear to installed reversed.
63	U1	1	35	11	2	6	11	0	5	7	0	NO	(2) two glass panes have been replaced. (6) hinge pins are bent appear to be loose, some installed reverse. (7) wall has small cracks bottom left of window.

Legend:

0 - Appears O.K. or item N/A due to window style or other
1 - Glazing putty cracked
2 - Glazing putty severely cracked with pieces falling away
3 - Corroded frame/sash
4 - Missing chains/hardware
5 - Rope used in lieu of chain
6 - Replace hinge pins
7 - Crack in wall due to moisture infiltration
8 - Gap between frame and wall jamb
9 - Loose or missing wall fasteners
10 - Frame/sash painted only
11 - Glass panes painted white

ILLUSTRATION 2:

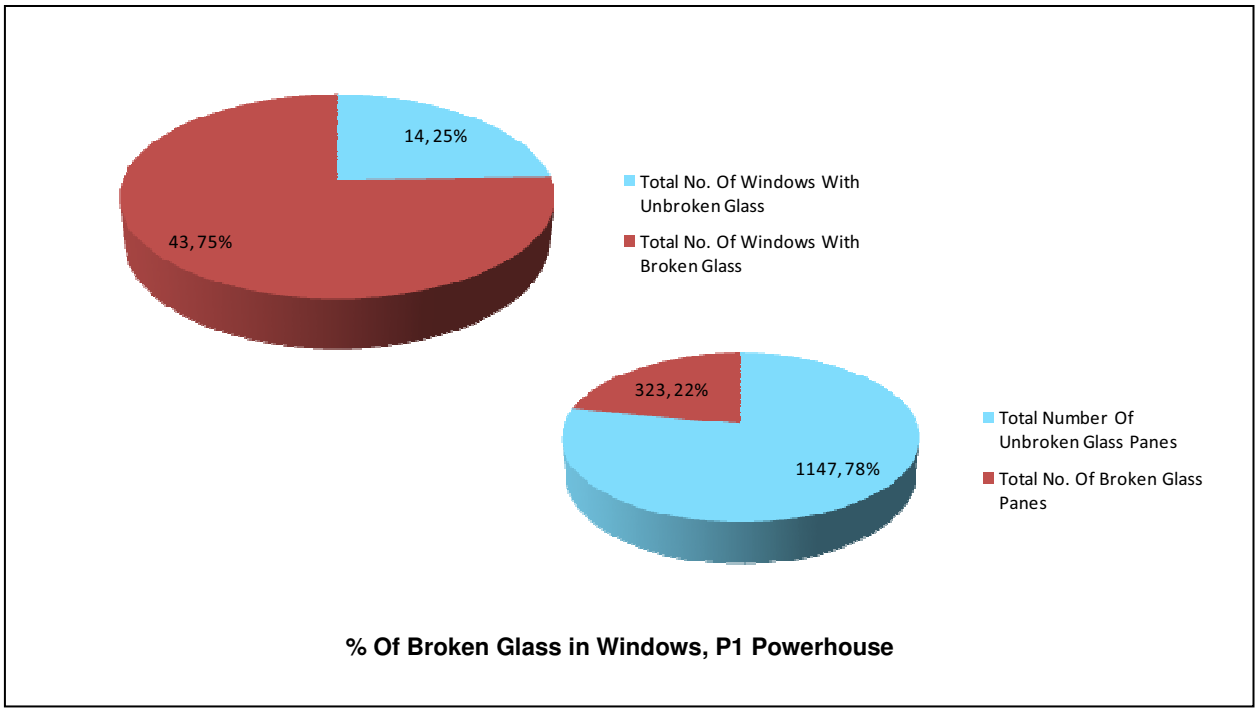
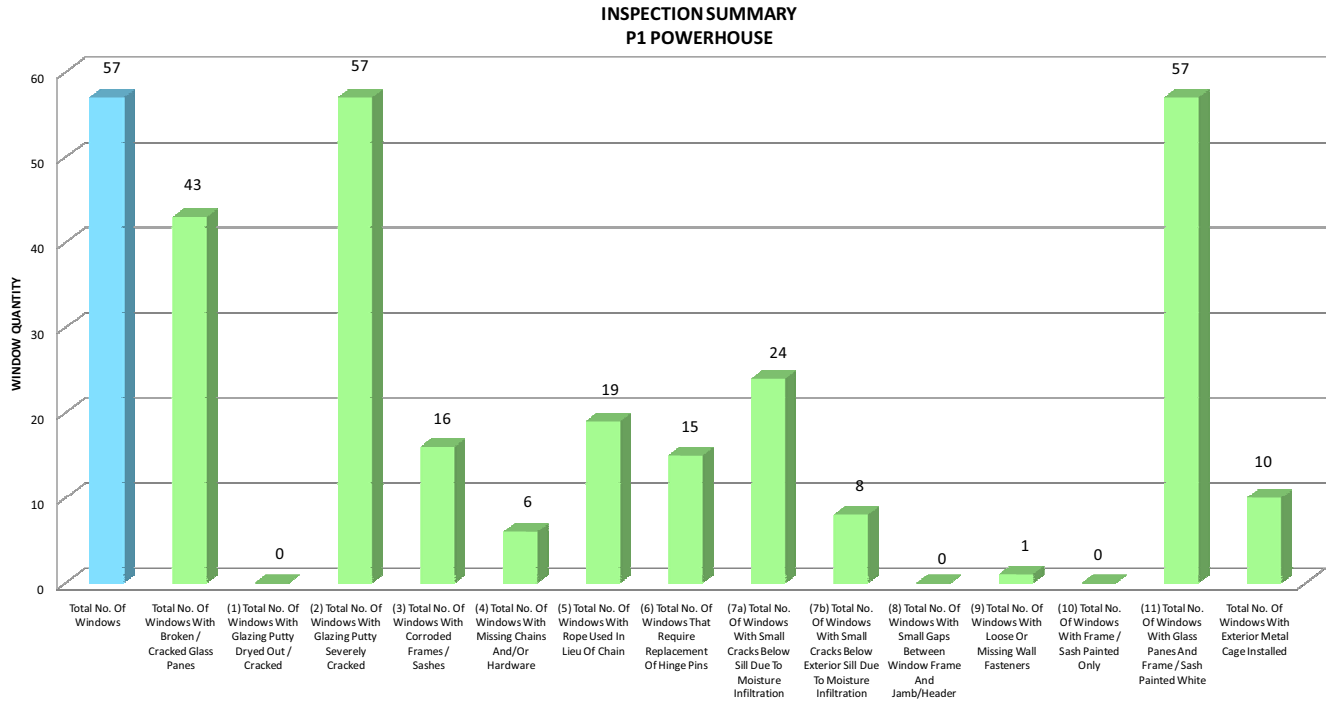


ILLUSTRATION 3:



3.2 Upper Bonnington (P2) (refer to Illustration 5, Inspection Summary P2 Powerhouse)

The original P2 powerhouse building was built in 1907 and a two-unit extension was made on the river side of the original plant in 1939. In the original powerhouse, the operator sashes in the windows are manually operated from the ground level and from working platforms in the plant. However, the original South Wall (river side) and the original North Wall (track side) of the P2 plant built in 1907 still have the original wood windows which appear to be in good shape and sheltered from the elements. There is one remaining window on the West Wall (downstream side) that requires replacement with vinyl thermal units that are stored on site.

In the 1939 extension, there is one window opening (B1) that has been cement-blocked in around cable trays that extend through the opening and was not inspected. Window 'C1' was inaccessible for inspection due to interior room installed inside the powerhouse and condition of the window on the interior could not be verified. The upper windows on the river side have been sealed shut and tagged, "To remain closed due to crane hitting open window" (see picture #'s 15, 16).

a) Window Frame Perimeter / Sill Condition (Interior):

The window frame perimeter on all the windows appear to be in good condition with tight seals against the jamb and header openings. The jamb and header areas of the window openings appear to be structurally sound. The steel mounting angle used to install the windows in the openings appear to be in good condition along the jambs and header areas. The sill portion of the steel mounting angle is typically concealed in a mortar bed and could not be inspected. 48% of the windows inspected were found to have small cracks appearing on and below the sill and wall areas of the windows. These small cracks are more likely caused by moisture infiltration through the bottom corners of the window frames (see Picture # 13). No caulking or sealants were visible on the interior.

b) Window Frame Anchorage Condition:

The window frame anchorage system on the P2 Powerhouse windows are 'through-bolted' through the window frames to window mounting angles. Window 'U3' on the P2 Window Inspection Schedule has a missing frame fastener located on the bottom-left side of the window.

c) Window Operator Sash Hinges / Pins:

The window operator sash hinges and pins are surface-mounted and for the most part appear to be in good condition with the exception of a couple of windows that have loose and / or sloppy hinges and windows that have had hinges pins replaced with bolts and nuts (see Picture # 17). Window 'I1' appears to have a missing pin and operates with some play and should be reviewed and repaired if required (see Picture # 14).

d) Window Coatings:

The window frames and sashes in the P2 powerhouse have been painted silver and the glass panes are unpainted. The window coatings on the frames and sashes appear to be in good condition.

e) Window Panes: (refer to Illustration 4, % of Broken Glass in Windows, P2 Powerhouse)

The existing window panes are ¼" Georgian wire-glass with a linear pattern manufactured into it to diffuse the light inside the powerhouse. 53% of the windows have cracked or broken glass panes or 5% of all individual glass panes are cracked or broken. The glass is still intact due to the wire-glass which is holding the broken pieces together within each pane.

f) Window Putty:

The window putty on all the windows located in the P2 Powerhouse was observed to be dried out and cracked and severely cracked in localized areas on upper windows located on the river-side of the powerhouse. The condition of the window putty is typically worse on the river-side of the powerhouse and it appears some window panes have been replaced in the past and some of the window putty replaced.

g) Window Opening & Closing Devices:

It was observed that 14 out of 25 windows that have ventilating operators in the P2 powerhouse have missing chains / hardware and 3 windows have rope pulls in lieu of chain.

h) Window Frame Perimeter / Sill (Exterior):

The window frame perimeter on all the windows appears to be in good condition with tight seals against the jamb and header openings. The jamb and header areas of the window openings appear to be structurally sound. No caulking or sealants were visible on the exterior perimeter except for those localized areas on the first level of windows on the downstream exterior side where cracked concrete sills have been patched. It is evident the patching is dried out and starting to crack where it has been applied (See picture 18).

Exterior metal cages have been installed to seven 2nd level windows on the downstream side to provide protection against birds and insects from entering the powerhouse while the ventilating operating windows are open.

i) Window Coatings (Exterior):

The window coatings on the exterior appear to be in good condition.

Redwood

Upper Bonnington (P2) Window Inspection

				INTERIOR INSPECTION						EXTERIOR INSPECTION		
			A	B	C	D	E	F	G	H	I	J
Window Location	Type	Size (No. of lites)	# Cracked / Broken Glass Panes	Glazing Putty Condition(no caulking used)	Window Hinges / pins on operators	Window Coatings	Window Frame Anchorage in concrete wall	Window Opening & Closing Device condition	Window Frame Perimeter / Sills	Exterior Condition	Metal Cage Installed	Window Description / Other
B1	5	35	0	0	0	0	0	0	0	0	NO	Window blocked in around cable trays.
C1	5	35	0	0	0	0	0	0	0	0	NO	Window inaccessible due to sound-proof room installed to interior side.
D1	5	35	2	1	6	10	0	4	0	7	NO	(6) Hinge pins replaced with nuts and bolts.
E1	5	35	2	1	0	10	0	0	0	7	NO	(7) Exterior window sill has been patched but is cracked.
F1	5	35	3	1	0	10	0	0	0	7	NO	(4) missing one chain, operator stuck - could not be opened. (7) Exterior window sill has been patched but is cracked.
G1	5	35	3	1	0	10	0	4, 5	0	0	NO	(4) one chain and one rope is used.
H1	5	35	2	1	0	10	0	0	0	7	NO	(7) Exterior window sill has been patched but is cracked.
I1	5	35	2	1	6	10	0	0	7	7	NO	(6) Hinge pins appear loose or sloppy and missing in 2 plcs. (7) Exterior window sill has been patched but is cracked.
I2	4	30	2	1	0	10	0	4	7	7	YES	(4) 2 ropes are used (ropes stretch when pulled) (7) small cracks at exterior bottom corners
H2	4	30	4	1	0	10	0	0	0	7	YES	(7) Exterior window has small cracks above.
G2	4	30	2	1	0	10	0	4, 5	0	7	YES	(4) one rope is used only. (7) Exterior window has small crack below.
F2	4	30	1	1	0	10	0	4, 5	0	7	YES	(4) one rope is used only. (7) Exterior window has small crack below.
E2	4	30	5	1	0	10	0	4	0	7	YES	(4) one chain is used only. (7) Exterior window has small crack below.
D2	4	30	1	1	0	10	0	4	0	7	YES	(4) no chains or latches on window.
C2	4	30	0	1	0	10	0	4	0	7	NO	(4) no chains or latches on window. (7) Exterior window has small crack below.
B2	4	30	3	1	0	10	0	0	0	7	YES	(7) Exterior window has small cracks above and below.
L2	4	30	3	1	0	10	0	4	0	0	NO	(4) Window is tagged to remain closed due to crane hitting open window
K2	4	30	0	1	0	10	0	4	0	0	NO	(4) Window is tagged to remain closed due to crane hitting open window
J2	4	30	0	1	0	10	0	4	0	0	NO	(4) Window is tagged to remain closed due to crane hitting open window
A3	1	20	0	1	0	10	0	0	0	0	NO	Window has high voltage 3 phase lines going through it.
B3	1	20	0	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
C3	1	20	0	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
D3	1	20	0	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
E3	1	20	0	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
F3	1	20	0	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
G3	1	20	0	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
H3	1	20	0	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
I3	1	20	1	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
J3	2	20	0	2	0	10	0	4	0	0	NO	(4) Window is tagged to remain closed due to crane hitting open window
K3	2	20	4	2	6	10	0	4	0	0	NO	(4) Window is tagged to remain closed due to crane hitting open window - window 'welded' shut
L3	2	20	2	2	0	10	0	4	0	12	NO	(4) Window is tagged to remain closed due to crane hitting open window (12) minor surface corrosion on sash.
M3	3	20	3	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
N3	3	20	0	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
O3	3	20	1	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
P3	3	20	1	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
Q3	1	20	1	1	0	10	0	0	7	0	NO	
R3	1	20	0	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
S3	1	20	0	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
T3	1	20	0	1	0	10	0	0	7	7	NO	(7) window has small cracks above and below.
U3	1	20	0	1	0	10	9	0	7	7	NO	(7) window has small cracks above and below. (9) Missing bottom-left wall fastener.

Legend:

0 - Appears O.K. or item N/A due to window style or other
1 - Glazing putty cracked
2 - Glazing putty severely cracked with pieces falling away
3 - Corroded frame/sash
4 - Missing chains/hardware
5 - Rope used in lieu of chain
6 - Replace hinge pins
7 - Crack in wall due to moisture infiltration
8 - Gap between frame and wall jamb
9 - Loose or missing wall fasteners
10 - Frame/sash painted only
11 - Glass panes painted white

ILLUSTRATION 4:

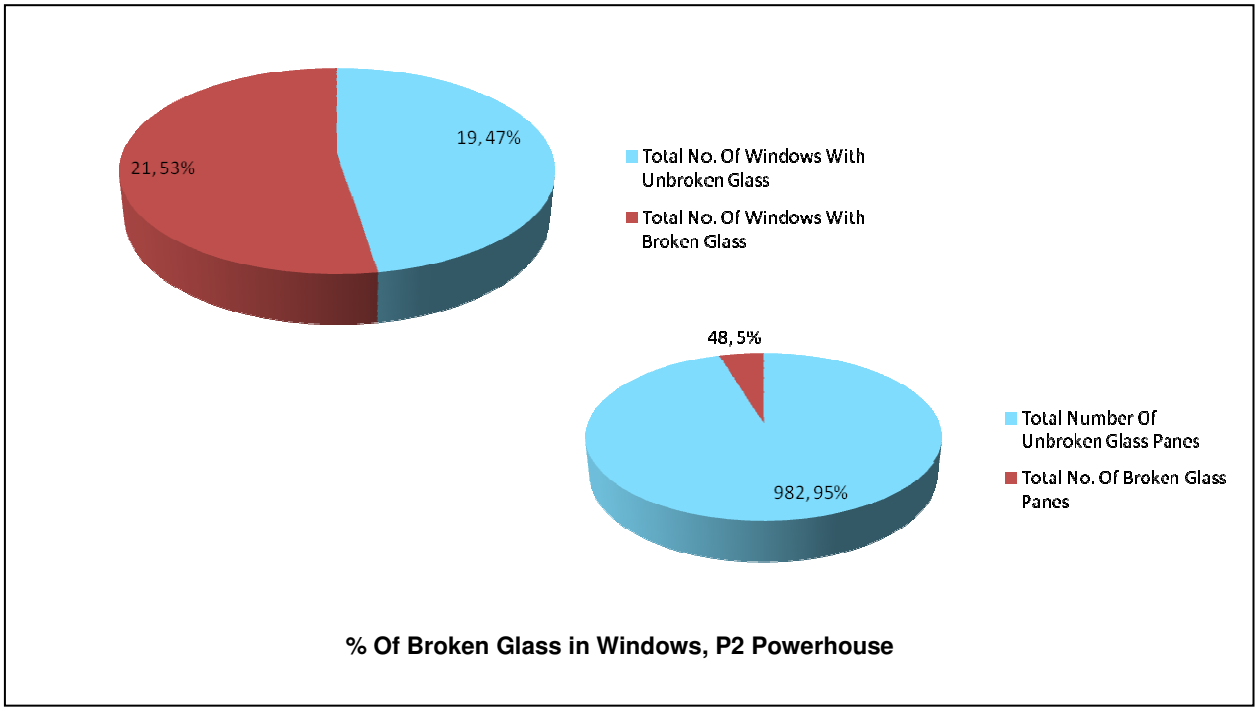
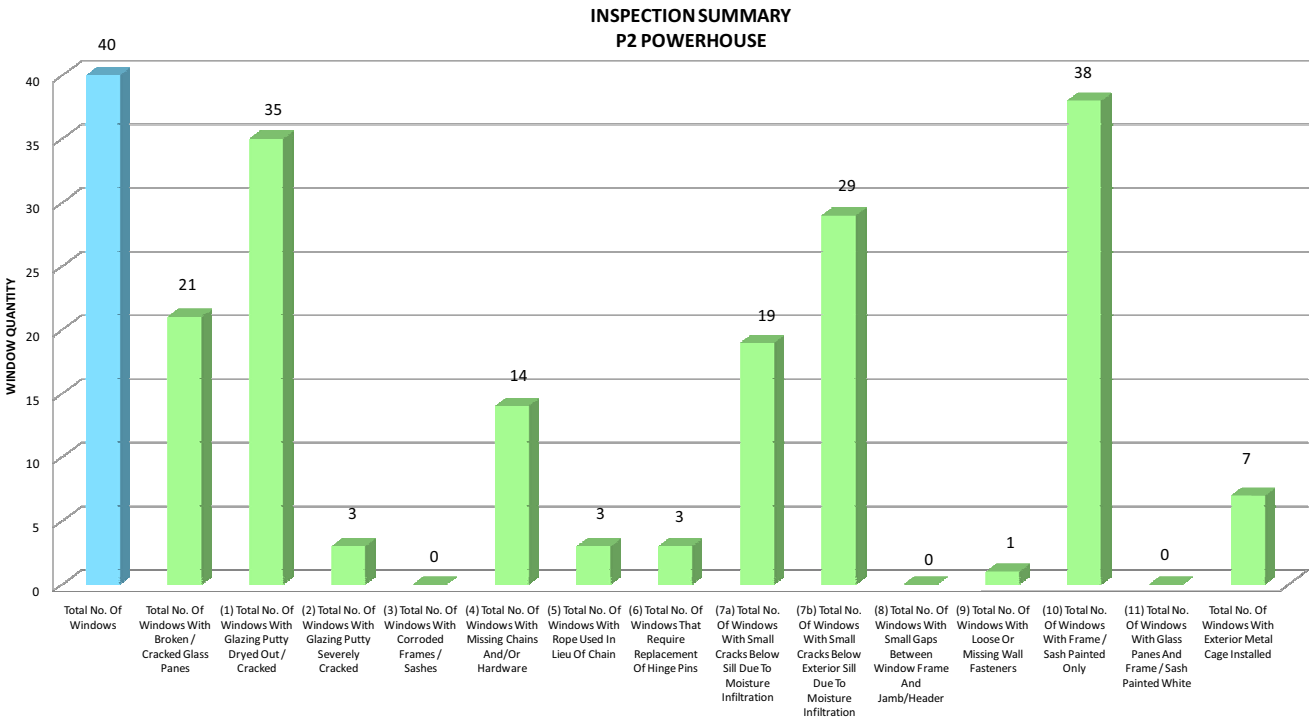


ILLUSTRATION 5:



3.3 South Slocan (P3) (refer to Illustration 7, Inspection Summary P3 Powerhouse)

a) Window Frame Perimeter / Sill Condition (Interior):

The window frame perimeter on all the windows appear to be in good condition with tight seals against the jamb and header openings except for one location where there is a small gap between the mounting angle and window frame on window 'G3'(see picture # 19) . The jamb and header areas of the window openings appear to be structurally sound. The steel mounting angle used to install the windows in the openings appears to be in good condition along the jambs and header areas. The sill portion of the steel mounting angle is typically concealed in a mortar bed and could not be inspected. 40% of the windows inspected were found to have small cracks appearing on and below the sill and wall areas of the windows. These small cracks are more likely caused by moisture infiltration through the bottom corners of the window frames. No caulking or sealants were visible on the interior.

b) Window Frame Anchorage Condition:

The window frame anchorage system on the P3 Powerhouse windows are 'through-bolted' through the window frames to window mounting angles. Window 'P3' on the P3 Window Inspection Schedule has a loose frame fastener located on the top- side of the window (see picture # 20).

c) Window Operator Sash Hinges / Pins:

The window operator sash hinges and pins are surface-mounted and for the most part appear to be in good condition with the exception of two windows that have loose and / or sloppy hinges and six windows that have had hinges pins replaced with bolts and nuts.

d) Window Coatings:

The window frames and sashes in the P3 powerhouse have been painted silver and the glass panes are unpainted. The window coatings on the frames and sashes appear to be in good condition.

e) Window Panes: (refer to Illustration 6, % of Broken Glass in Windows, P3 Powerhouse)

The existing window panes are ¼" Georgian wire-glass with a wavy pattern manufactured into it to diffuse the light inside the powerhouse. 67% of the windows have cracked or broken glass panes or 9% of all individual glass panes are cracked or broken. The glass is still intact due to the wire-glass which is holding the broken pieces together within each pane.

f) Window Putty:

68% of the window putty on all the windows located in the P3 Powerhouse was observed to be dried out and cracked and in localized areas on windows located on the river-side and down-

stream side of the powerhouse. The balance of the putty on the windows appears to be in adequate condition with no cracking visible.

g) Window Opening & Closing Devices:

It was observed that 31 out of 54 windows that have ventilating operators in the P2 powerhouse have missing chains / hardware and 1 window was found to have rope pulls in lieu of chain. Four windows located on the 3rd level on the up-stream side of the powerhouse have ventilated operators that are operated from the exterior roof using wood blocks for stay-open devices in lieu of the proper hardware (see picture # 22).

h) Window Frame Perimeter / Sill (Exterior):

The window frame perimeter on all the windows appears to be in good condition with tight seals against the jamb and header openings. The jamb and header areas of the window openings appear to be structurally sound. No caulking or sealants were visible on the exterior perimeter except for those localized areas on the first level of windows on the downstream exterior side and upper level windows on the up-stream side where cracked concrete sills have been patched. It is evident the patching is dried out and starting to crack where it has been applied (See pictures 23, 24).

Exterior metal cages have been installed to eight 2nd level windows on the downstream side to provide protection against birds and insects from entering the powerhouse while the ventilating operating windows are open.

i) Window Coatings (Exterior):

The window coatings on the exterior appear to be in good condition.

Redwood

South Slocan (P3) Window Inspection

				INTERIOR INSPECTION						EXTERIOR INSPECTION		
				A	B	C	D	E	F	G	H	I	J
	Window Location	Type	Size (No. of lites)	# Cracked / Broken Glass Panes	Glazing Putty Condition(no caulking used)	Window Hinges / pins on operators	Window Coatings	Window Frame Anchorage in concrete wall	Window Opening & Closing Device condition	Window Frame Perimeter / Sills	Exterior Condition	Metal Cage Installed	Window Description / Other
	G2	4	30	1	1	0	10	0	0	0	7	NO	No caulking used.
	H2	4	30	0	1	0	10	0	4	0	0	NO	
	I2	4	30	1	1	0	10	0	4	7	7	NO	(7) wall has small cracks bottom left & right of window.
	J2	4	30	1	1	0	10	0	4	0	0	NO	
	K2	4	30	2	1	0	10	0	0	0	7	YES	(7) wall has small cracks bottom left of window.
	L2	4	30	5	1	6	10	0	0	0	7	YES	(6) Hinge pins appear loose or sloppy and missing - lower left pin. (7) wall has small cracks bottom left of window.
	M2	4	30	3	1	0	10	0	4	0	7	YES	(4) Upper chain missing. (7) wall has small cracks bottom left & right of window.
	N2	4	30	7	1	0	10	0	0	0	7	YES	(7) wall has small cracks bottom left of window.
	O2	4	30	4	1	0	10	0	0	0	7	YES	(7) wall has small cracks bottom left of window.
	P2	4	30	3	1	0	10	0	0	0	7	YES	(7) wall has small cracks bottom left & right of window.
	Q2	4	30	3	1	0	10	0	0	0	7	YES	(7) wall has small cracks bottom left of window.
	R2	4	30	3	1	0	10	0	4	0	0	YES	(4) Upper chain missing.
	S2	4	30	5	1	0	10	0	4	0	7	NO	(4) Upper chain missing. (7) wall has small cracks bottom left & right of window.
	T2	4	30	1	1	0	10	0	4	0	7	NO	(4) Upper chain missing. (7) wall has small cracks bottom left & small holes right of window.
	U2	4	30	3	1	0	10	0	4	0	0	NO	(4) Upper chain missing.
	V2	4	30	7	1	0	10	0	0	0	0	NO	One window pane replaced.
	FF2	4	30	0	0	0	10	0	0	0	7	NO	(7) wall has small cracks right of window.
	GG2	4	30	1	0	0	10	0	0	7	7	NO	(7) wall has small cracks left & right of window.
	HH2	4	30	0	0	0	10	0	0	0	7	NO	(7) wall has small cracks bottom left & right of window.
	II2	4	30	1	0	0	10	9	4	0	0	NO	(9) Three wall fasteners missing
	G3	1	20	0	1	0	10	8	0	0	7	NO	(7) wall has small cracks bottom right of window. (8) small gaps between mounting angle and wall jamb/header.
	H3	1	20	0	1	0	10	0	0	7	7	NO	(7) wall has small cracks bottom left & right of window.
	I3	1	20	0	1	0	10	0	0	7	7	NO	(7) wall has small cracks bottom of window.
	J3	1	20	0	1	0	10	0	0	7	7	NO	(7) wall has small cracks at four corners of window.
	K3	1	20	0	1	0	10	0	0	7	7	NO	(7) wall has small cracks left & right of window.
	L3	1	20	0	1	0	10	0	0	7	7	NO	(7) wall has small cracks left & right of window.
	M3	1	20	0	1	0	10	0	0	7	7	NO	(7) wall has small cracks left & right of window.
	N3	1	20	0	1	0	10	0	0	7	7	NO	(7) wall has small cracks left & right of window.
	O3	1	20	0	1	0	10	0	0	7	7	NO	(7) wall has small cracks left & right of window.
	P3	1	20	0	1	0	10	9	0	7	7	NO	(7) wall has small cracks left & right of window. (9) Top wall fastener loose.
	Q3	1	20	0	1	0	10	0	0	7	7	NO	(7) wall has small cracks bottom of window.
	R3	1	20	0	1	0	10	0	0	7	7	NO	(7) wall has small cracks bottom of window.
	S3	1	20	0	1	0	10	0	0	7	7	NO	(7) wall has small cracks bottom of window.
	T3	2	20	2	1	0	10	0	4	7	0	NO	(7) wall has small cracks bottom of window.
	U3	2	20	3	1	0	10	0	4	7	0	NO	(7) wall has small cracks bottom of window.
	V3	2	20	3	1	0	10	0	4	7	0	NO	Operator pane appears to be seized in closed position.
	W3	2	20	1	0	0	10	0	4	7	0	NO	(7) wall has small cracks left & right of window.
	X3	2	20	1	0	0	10	0	4	7	0	NO	(4) Block of wood used as window hold-open device from roof. (7) wall has small cracks left & right of window.
	Y3	2	20	2	0	0	10	0	4	7	0	NO	(4) Block of wood used as window hold-open device from roof. (7) wall has small cracks left of window.
	Z3	2	20	2	0	0	10	0	4	7	0	NO	(4) Block of wood used as window hold-open device from roof. (7) wall has small cracks left & right of window.
	AA3	2	20	1	0	0	10	0	4	7	0	NO	(7) wall has small cracks left & right of window.
	BB3	2	20	0	0	0	10	0	4	7	0	NO	(4) Block of wood used as window hold-open device from roof.(4) Block of wood used as window hold-open device from roof.
	CC3	2	20	1	0	0	10	0	0	0	0	NO	

Legend:

0 - Appears O.K. or Item N/A due to window style or other
1 - Glazing putty cracked
2 - Glazing putty severely cracked with pieces falling away
3 - Corroded frame/sash
4 - Missing chains/hardware
5 - Rope used in lieu of chain
6 - Replace hinge pins
7 - Crack in wall due to moisture infiltration
8 - Gap between frame and wall jamb
9 - Loose or missing wall fasteners
10 - Frame/sash painted only
11 - Glass panes painted white

Redwood

South Slocan (P3) Window Inspection

				INTERIOR INSPECTION						EXTERIOR INSPECTION		
				A	B	C	D	E	F	G	H	I	J
	Window Location	Type	Size (No. of lites)	# Cracked / Broken Glass Panes	Glazing Putty Condition(no caulking used)	Window Hinges / pins on operators	Window Coatings	Window Frame Anchorage in concrete wall	Window Opening & Closing Device condition	Window Frame Perimeter / Sills	Exterior Condition	Metal Cage Installed	Window Description / Other
10	DD3	2	20	5	0	0	10	0	0	0	0	NO	
11	EE3	1	20	2	0	0	10	0	0	0	0	NO	Conduit running through bottom right window on inside.
12	FF3	1	20	0	0	0	10	0	0	0	0	NO	
13	GG3	1	20	2	0	0	10	0	0	0	0	NO	
14	HH3	1	20	0	0	0	10	0	0	0	0	NO	
15	II3	1	20	0	0	0	10	0	0	0	0	NO	
16	C3	4	20	1	0	0	10	0	4	0	0	NO	(4) Chain disconnected to upper operator pane.
17	D3	4	20	0	0	0	10	0	4	0	0	NO	(4) Chain disconnected to upper operator pane.
18	E3	4	20	1	0	0	10	0	4	0	0	NO	(4) Chain disconnected to upper operator pane.
19	JJ2	2	20	0	0	0	0	0	0	0	0	0	Window not inspected; part of exterior Switch Room.
20	KK2	2	20	0	0	0	0	0	0	0	0	0	Window not inspected; part of exterior Switch Room.
21	H1	5	35	6	1	6	10	0	4	0	7	NO	(4) Chain missing on upper operator window. (6) Nuts and bolts used to replace hinge pins. (7) wall has small cracks bottom of window.
22	I1	5	35	4	1	0	10	0	4, 5	0	7	NO	(4) Chain missing on upper operator window. (5) Rope used on lower operator window. (7) window sill corners patched but there are small cracks coming through.
23	J1	5	35	3	1	0	10	0	4	0	7	NO	Conduit passing through window panel. (7) window sill corners patched but there are small cracks coming through.
24	K1	5	35	9	1	6	10	0	0	0	7	NO	(6) Hinge pins appear to be loose on lower sash.
25	L1	5	35	9	1	6	10	0	4	0	7	NO	(4) Chain not connected to bottom operator window (6) Nuts and bolts used to replace hinge pins. (7) window sill corners patched but there are small cracks coming through.
26	M1	5	35	7	1	0	10	0	4	0	7	NO	(4) Chain not connected to upper operator window. (7) window sill corners patched but there are small cracks coming through.
27	N1	5	35	4	1	6	10	0	4	0	7	NO	(4) Bottom operator window seems to be seized; latch not working properly (6) Nuts and bolts used to replace hinge pins. (7) window sill corners patched but there are small cracks coming through.
28	O1	5	35	6	1	6	10	0	0	0	7	NO	(6) Nuts and bolts used to replace hinge pins. (7) window sill corners patched but there are small cracks coming through.
29	P1	5	35	5	1	0	10	0	0	0	7	NO	(7) window sill corners patched but there are small cracks coming through.
30	Q1	5	35	5	1	6	10	0	4	0	7	NO	(6) Loose or missing hinge pins on bottom operator window. (7) window sill corners patched but there are small cracks coming through.
31	R1	5	35	3	1	6	10	0	4	0	7	NO	(6) Nuts and bolts used to replace hinge pins. (7) window sill corners patched but there are small cracks coming through.
32	S1	5	35	7	1	0	10	0	4	0	7	NO	(4) Need new chain-stay (wall anchor). (7) wall has small cracks bottom of window.
33	T1	2	20	4	1	0	10	0	0	0	7	NO	(7) wall has small cracks bottom of window.
34	U1	5	35	7	1	0	10	0	0	0	7	NO	(7) wall has small cracks bottom of window.
35	V1	5	35	6	1	0	10	0	4	0	12	NO	(4) Lower chain missing.

Legend:

0 - Appears O.K. or item N/A due to window style or other
1 - Glazing putty cracked
2 - Glazing putty severely cracked with pieces falling away
3 - Corroded frame/sash
4 - Missing chains/hardware
5 - Rope used in lieu of chain
6 - Replace hinge pins
7 - Crack in wall due to moisture infiltration
8 - Gap between frame and wall jamb
9 - Loose or missing wall fasteners
10 - Frame/sash painted only
11 - Glass panes painted white

ILLUSTRATION 6:

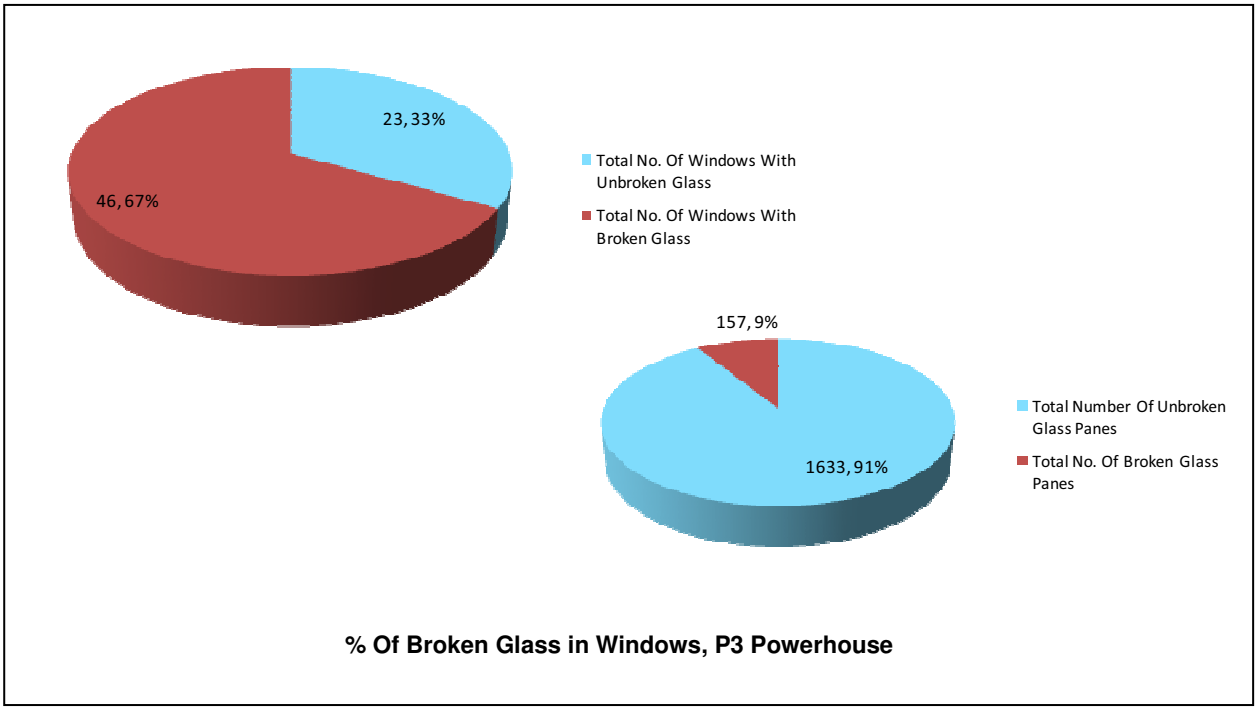
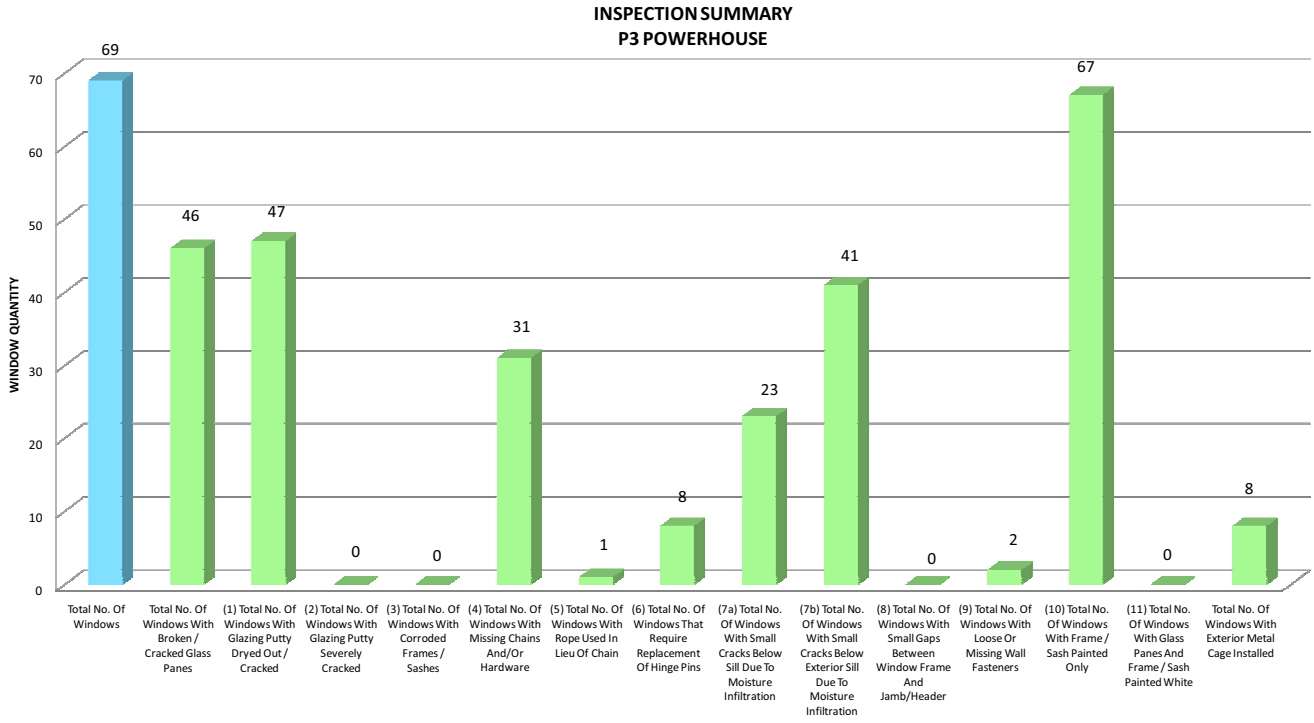


ILLUSTRATION 7:



3.4 Corra Linn (P4) (refer to Illustration 9, Inspection Summary P4 Powerhouse)

a) Window Frame Perimeter / Sill Condition (Interior):

The window frame perimeter on all the windows appear to be in good condition with tight seals against the jamb and header openings except for one location where there is a small gap between the mounting angle and window frame at header and sill on window 'N3' (see picture # 25). The steel mounting angle used to install the windows in the openings appears to be in good condition along the jambs and header areas, but some of the upper windows do not have the sill mounting angle grouted in as per the installation specifications. The sill portion of the steel mounting angle instead is mechanically fastened to the sill, similar to that of the jambs and headers. 10% of the windows inspected were found to have small cracks appearing on and below the sill and wall areas of the windows. These small cracks are more likely caused by moisture infiltration through the bottom corners of the window frames. No caulking or sealants were visible on the interior.

b) Window Frame Anchorage Condition:

The window frame anchorage systems on the P2 Powerhouse windows are 'through-bolted' through the window frames to window mounting angles. Window 'FF2' on the P4 Window Inspection Schedule has missing frame fasteners located on the top left and right sides of the window (see picture # 26).

c) Window Operator Sash Hinges / Pins:

The window operator sash hinges and pins are of concealed or hidden design that appears to be good condition with no deficiencies noted.

d) Window Coatings:

The window frames and sashes in the P4 powerhouse have been painted silver and the glass panes are unpainted. The window coatings on the frames and sashes appear to be in good condition.

e) Window Panes: (refer to Illustration 8, % of Broken Glass in Windows, P4 Powerhouse)

The existing window panes are ¼" Georgian wire-glass with a wavy pattern manufactured into it to diffuse the light inside the powerhouse. 74% of the windows have cracked or broken glass panes or 16% of all individual glass panes are cracked or broken. The glass is still intact due to the wire-glass which is holding the broken pieces together within each pane.

f) Window Putty:

77% of the window putty on all the windows located in the P3 Powerhouse was observed to be dried out and cracked and 23% of the window putty was observed to be severely cracked with some broken pieces in localized areas on the bottom sash areas of the windows located on the 2nd and 3rd level of the down-stream side of the powerhouse.

g) Window Opening & Closing Devices:

Out of the 73 windows that have ventilating operators in the P4 powerhouse, it was observed that 18 windows have missing chains / hardware and another 3 windows have had the existing chains replaced with rope. Windows located on the 3rd level on the up-stream side of the powerhouse have ventilated operators that are operated from the exterior roof and one window (V3) has a wood branch being used for a stay-open device in lieu of the proper hardware (see picture # 27).

h) Window Frame Perimeter / Sill (Exterior):

The window frame perimeter on all the windows appear to be in good condition with tight seals against the jamb and header openings. The jamb and header areas of the window openings appear to be structurally sound. No caulking or sealants were visible on the exterior perimeter. Some sills have small localized cracks (see typical picture, # 28).

Exterior metal cages have been installed to six 2nd level windows on the downstream side to provide protection against birds and insects from entering the powerhouse while the ventilating operating windows are open.

One window has been partially sealed off due to cable tray running through it and another window is completely sealed off on the inside. One window has been partially removed to allow for warm air from the power house to vent into warm-room created on rooftop on exterior upstream side to allow personnel to enter into and stay warm during the winter months (see picture #'s 29 to 31).

i) Window Coatings (Exterior):

The window coatings on the exterior appear to be in good condition.

Redwood

Corra Linn (P4) Window Inspection

				INTERIOR INSPECTION							EXTERIOR INSPECTION		
				A	B	C	D	E	F	G	H	I	J
	Window Location	Type	Size (No. of lites)	# Cracked / Broken Glass Panes	Glazing Putty Condition(no caulking used)	Window Hinges / pins on operators	Window Coatings	Window Frame Anchorage in concrete wall	Window Opening & Closing Device condition	Window Frame Perimeter / Sills	Exterior Condition	Metal Cage Installed	Window Description / Other
	A2	4	30	7	2	0	10	0	4	0	0	NO	Hinge pins are sealed type, typical for all operator windows. (4) Upper chain missing.
	B2	4	30	8	1	0	10	0	0	0	0	NO	
	C2	4	30	3*	1	0	10	0	4*	0	0*	NO	(0*,3*, 4*) cable tray running through window and window sealed off on exterior with sheet metal work.
	C3	2	20	1	2	0	10	0	0	0	0	NO	
	D3	1	20	1	1	0	10	0	0	0	0	NO	
	E3	1	20	0	1	0	10	0	0	0	0	NO	
	F3	1	20	0	1	0	10	0	0	0	0	NO	
	G3	1	30	0	1	0	10	0	0	0	0	NO	
	H3	1	30	1	1	0	10	0	0	0	0	NO	
	I3	1	20	0	1	0	10	0	0	0	0	NO	
	J3	1	20	0	1	0	10	0	0	0	0	NO	
	K3	1	20	0	1	0	10	0	0	0	0	NO	
	L3	1	20	0	1	0	10	0	0	0	0	NO	
	M3	1	20	0	1	0	10	0	0	0	0	NO	
	N3	1	20	0	1	0	10	0	0	7, 8	0	NO	(7) window has small crack below bottom left corner. (8) small gaps between frame and perimeter wall at sill and header.
	O3	1	20	0	1	0	10	0	0	0	0	NO	
	P3	1	20	0	1	0	10	0	0	0	0	NO	
	Q3	2	30	3	2	0	10	0	4	0	0	NO	(4) chain operator replaced with rope operator.
	R3	2	20	5	2	0	10	0	4	0	0	NO	(4) chain operator replaced with rope operator.
	S3	2	20	3	2	0	10	0	0	0	0	NO	
	T3	3	20	2	1	0	10	0	0	0	0	NO	Window operation from exterior roof using bracket.
	U3	3	20	1	1	0	10	0	4	7, 9	0	NO	Window operation from exterior roof using stick in lieu of bracket. (7) wall has small crack below left of window. (9) missing frame fastener top left side.
	V3	3	20	0	1	0	10	0	0	7, 9	0	NO	Window operation from exterior roof using bracket. (7) wall has small crack below left of window. (9) missing frame fastener top left & right side.
	W3	3	20	3	1	0	10	0	0	7, 9	0	NO	Window operation from exterior roof using bracket. (7) wall has small crack below left of window. (9) missing frame fastener top left & right side.
	X3	3	20	0	1	0	10	0	0	7, 9	0	NO	Window operation from exterior roof using bracket. (7) wall has small crack below left of window. (9) missing frame fastener top left side.
	Y3	3	20	2	1	0	10	0	0	7	0	NO	Window operation from exterior roof using bracket. (7) wall has small crack below left of window.
	Z3	3	20	3	1	0	10	0	0	7, 9	0	NO	Window operation from exterior roof using bracket. (7) wall has small crack below left and right of window. (9) missing frame fastener top right side.
	AA3	3	20	1	1	0	10	0	0	7, 9	0*	NO	(0*) window removed partially for exterior roof warm-room. (7) wall has small crack below left of window. (9) missing frame fastener top right side.
	BB3	1	20	1	1	0	10	0	0	0	0	NO	
	CC3	1	20	0	1	0	10	0	0	0	0	NO	
	DD3	1	20	0	1	0	10	0	0	0	0	NO	
	EE3	1	20	1	1	0	10	0	0	0	0	NO	
	FF3	1	20	0	1	0	10	0	0	0	0	NO	

Legend:

0 - Appears O.K. or item N/A due to window style or other
1 - Glazing putty cracked
2 - Glazing putty severely cracked with pieces falling away
3 - Corroded frame/sash
4 - Missing chains/hardware
5 - Rope used in lieu of chain
6 - Replace hinge pins
7 - Crack in wall due to moisture infiltration
8 - Gap between frame and wall jamb
9 - Loose or missing wall fasteners
10 - Frame/sash painted only
11 - Glass panes painted white

Redwood

Corra Linn (P4) Window Inspection

				INTERIOR INSPECTION								EXTERIOR INSPECTION	
				A	B	C	D	E	F	G	H	I	J
	Window Location	Type	Size (No. of lites)	# Cracked / Broken Glass Panes	Glazing Putty Condition(no caulking used)	Window Hinges / pins on operators	Window Coatings	Window Frame Anchorage in concrete wall	Window Opening & Closing Device condition	Window Frame Perimeter / Sills	Exterior Condition	Metal Cage Installed	Window Description / Other
	A3	2	20	0	1	0	10	0	0	0	0	NO	
	B3	2	20	1	1	0	10	0	0	9	0	NO	(9) missing frame fastener top right side.
	E1	5	35	8	1	0	10	0	4	0	0	NO	(4) chains missing
	F1	5	35	0	1	0	10	0	0*	0	0	NO	* Window opening has been completely shuttered/sealed off on the inside.
	G1	5	35	3	1	0	10	0	0*	0	0	NO	* Access to interior side of window restricted due to proximity to live terminals. Close inspection of window prevented.
	H1	5	35	5	1	0	10	0	4*	0	0	NO	(4) rope used on bottom operator window. * Access to interior side of window restricted due to proximity to live terminals. Close inspection of window prevented.
	I1	5	35	10	2	0	10	0	4	0	0	NO	(4) chain missing on upper window operator.
	J1	5	35	9	1	0	10	0	0	0	7	NO	(7) wall has small crack above window.
	K1	5	35	9	1	0	10	0	0	0	7	NO	(7) wall has small crack above window.
	L1	5	35	8	1	0	10	0	0	0	7	NO	(7) wall has small crack above window.
	M1	5	35	7	1	0	10	0	0	0	7	NO	(7) wall has small crack above and below window.
	N1	5	35	10	1	0	10	0	0	0	7	NO	(7) wall has small crack above and below window.
	O1	5	35	9	1	0	10	0	4	0	7	NO	(5) rope used on bottom window operator. (7) sill has small crack bottom left of window.
	P1	5	35	10	1	0	10	0	0	0	0	NO	
	Q1	3	30	3	1	0	10	0	0	0	0	NO	
	R1	5	35	9	1	0	10	0	5	0	0	NO	(5) rope used on both window operators.
	S1	5	35	6	2	0	10	0	0	0	7	NO	(7) sill has small crack bottom right of window.
	C1	5	35	3	1	0	10	0	4	0	0*	NO	(0*) sheetmetal installed over exterior of window (4) upper window operator missing chain.
	B1	5	35	8	1	0	10	0	4	0	0	NO	(4) upper window operator missing chain.
	A1	5	35	4	1	0	10	9	4	9	7	NO	(4) missing chains on window operators. (7) repair broken sill grout. (9) missing bottom left sash fastener.
	D2	4	30	5	1	0	10	0	4	0	0	NO	(4) missing chains on window operators.
	E2	4	30	7	1	0	10	0	4	0	0	NO	(4) missing chains on window operators.
	F2	4	30	5	1	0	10	0	4	0	0	NO	(4) missing chains on window operators.
	G2	4	30	3	1	0	10	0	4	0	0	NO	(4) missing chains on window operators.
	H2	4	30	11	2	0	10	0	0	0	0	NO	
	I2	4	30	7	2	0	10	0	0	0	0	NO	
	J2	4	30	12	1	0	10	0	4	0	0	YES	(4) rope spliced onto chain to lengthen it.
	K2	4	30	8	2	0	10	0	0	0	0	YES	
	L2	4	30	9	2	0	10	0	5	0	7	YES	(5) rope spliced onto chain to lengthen it. (7) wall has small crack below window.
	M2	4	30	7	2	0	10	0	0	0	7	NO	(7) wall has small crack below window.
	N2	4	30	7	2	0	10	0	0	0	0	YES	
	O2	4	30	11	2	0	10	0	5	0	0	YES	(5) rope used in lieu of chain on window operator.
	P2	4	30	4	2	0	10	0	0	0	0	YES	
	Q2	4	30	7	1	0	10	0	4	0	0	NO	(4) chain missing on upper window operator.
	R2	4	30	14	2	0	10	0	4	0	0	NO	(4) rope used in lieu of chain on lower window operator.
	S2	4	30	14	2	0	10	0	0	0	0	NO	
	CC2	4	30	0	1	0	10	0	0	0	0	NO	
	DD2	4	30	8	1	0	10	0	0	0	0	NO	
	EE2	4	30	2	1	0	10	0	0	0	0	NO	
	FF2	4	30	2	1	0	10	9	4	0	0	NO	(4) Missing chains on window operators (9) missing frame fasteners at top of each side.

Legend:

0 - Appears O.K. or item N/A due to window style or other
1 - Glazing putty cracked
2 - Glazing putty severely cracked with pieces falling away
3 - Corroded frame/sash
4 - Missing chains/hardware
5 - Rope used in lieu of chain
6 - Replace hinge pins
7 - Crack in wall due to moisture infiltration
8 - Gap between frame and wall jamb
9 - Loose or missing wall fasteners
10 - Frame/sash painted only
11 - Glass panes painted white

ILLUSTRATION 8:

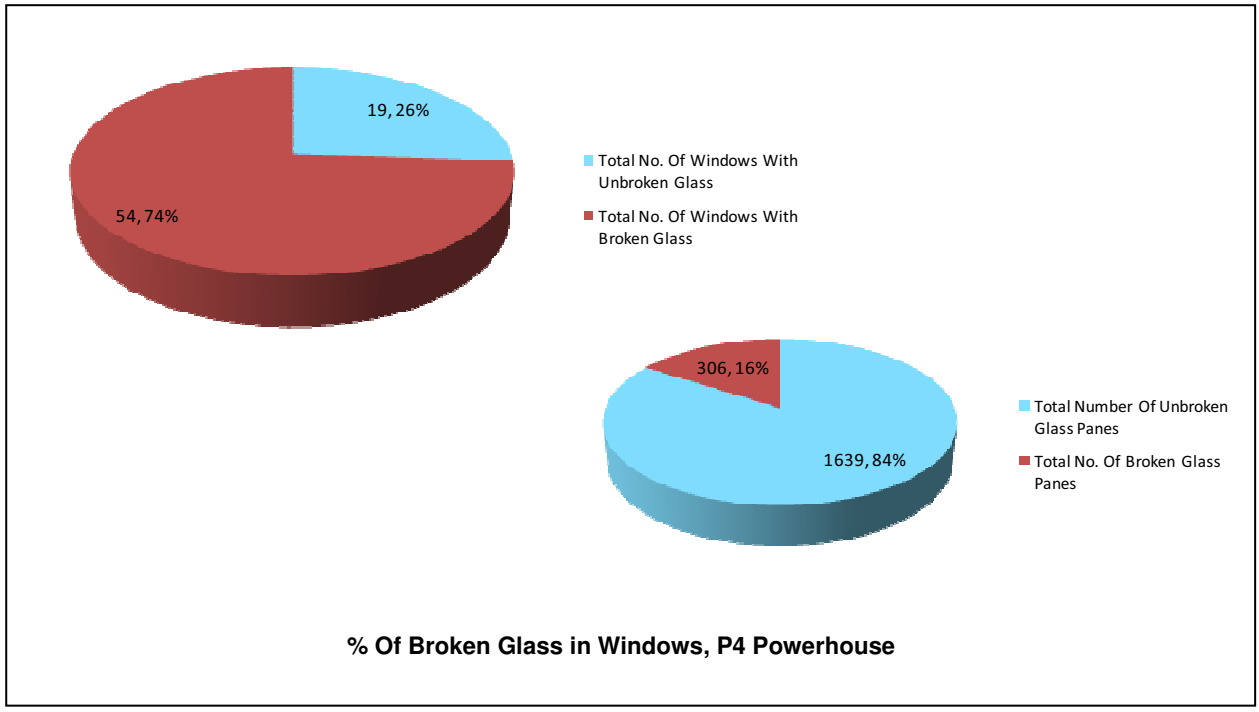
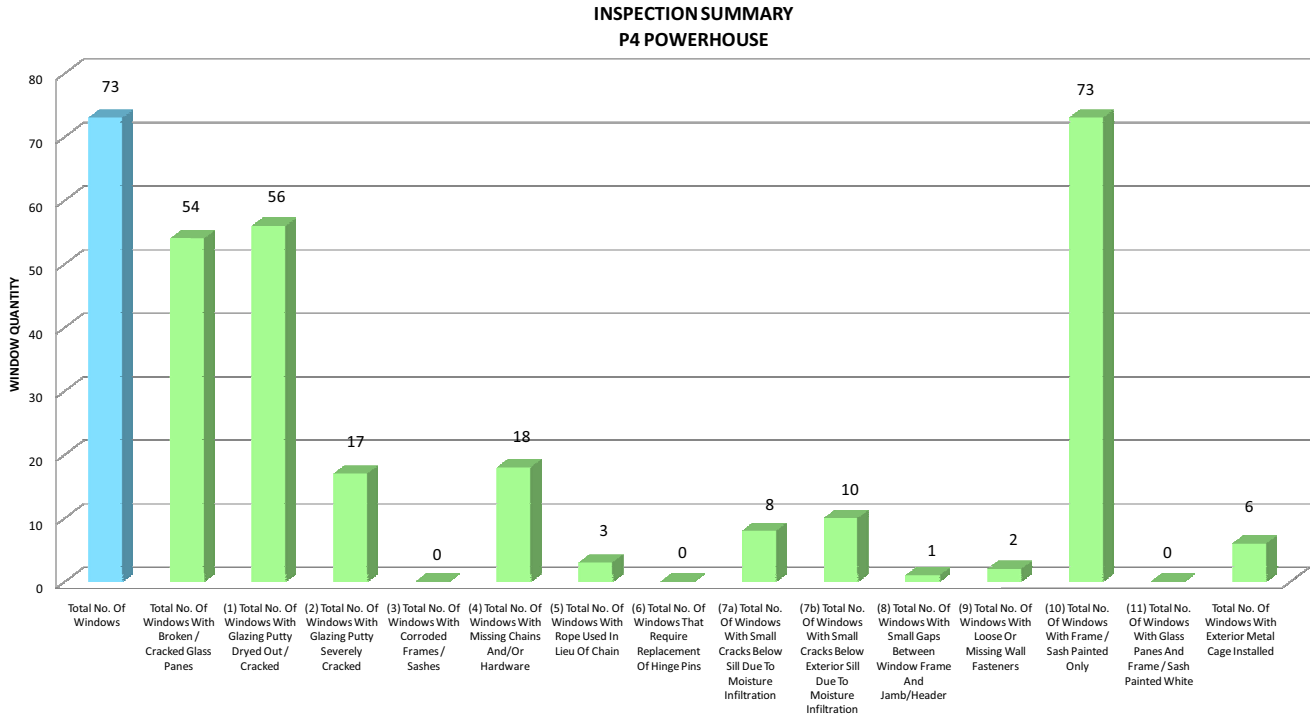


ILLUSTRATION 9:

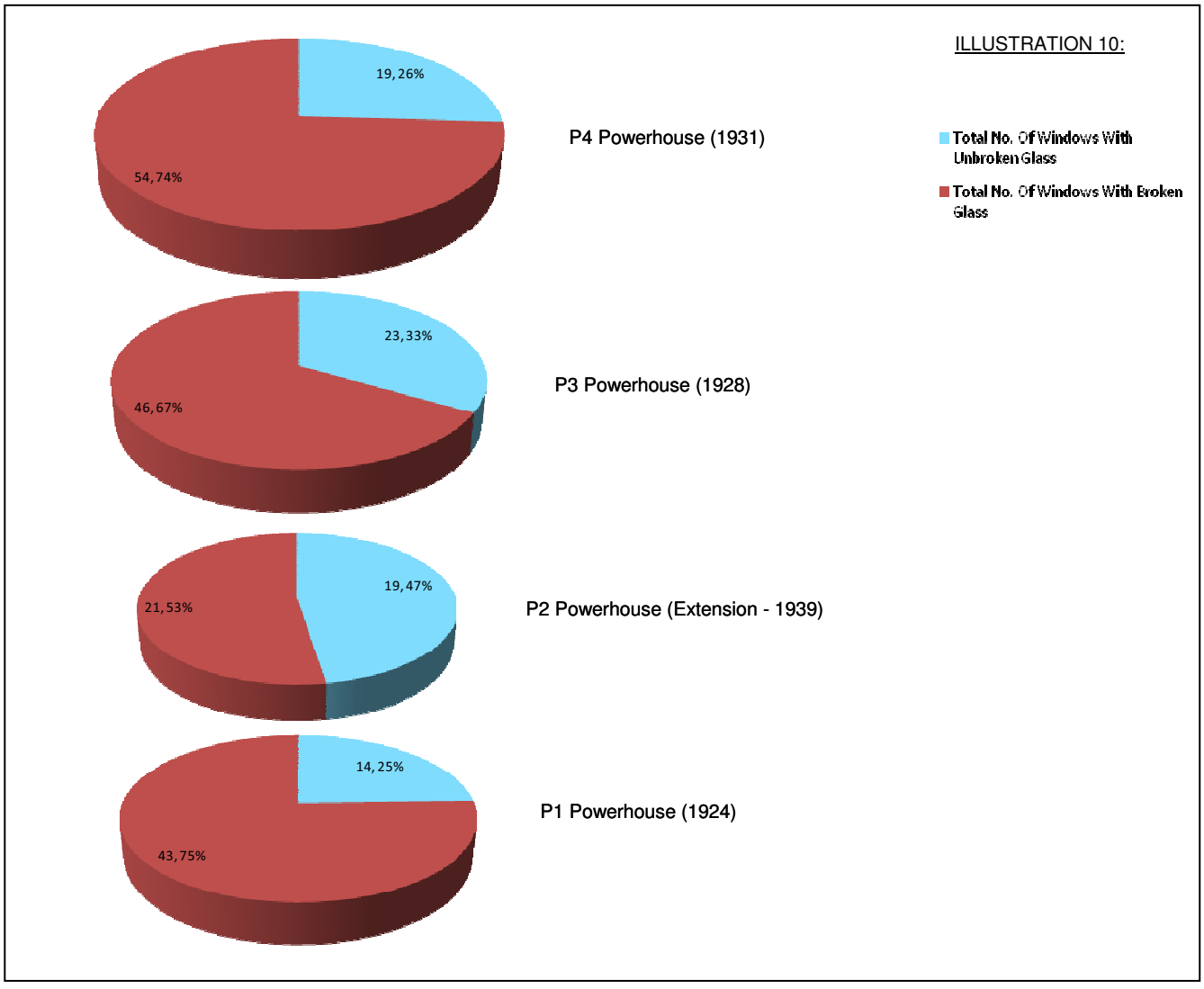


4.0 Summary & Conclusions

4.1 General

The Inspection Summary chart and bar-graph on Illustration # 11 graphically summarizes the results from the P1 to P4 powerhouse windows inspection. There is a correlation with the results of the inspection and the age of the powerhouses; with more age, the windows have been exposed to more weather and wear and tear from operation in the powerhouses. The exception to this is the P3 Powerhouse. There are only 3 years separating the P3 powerhouse from P4 Powerhouse (which is more recently built) but there is a small % of more broken windows in P4 Powerhouse and the window putty appears to be in better condition in P3 Powerhouse too. This variation could possibly be due to the orientation of the buildings with respect to exposure to sunlight and weather.

On the basis of broken glass panes, the greatest # of windows with broken glass panes is the P4 Powerhouse with 54 windows that have broken glass panes, followed next by P3 Powerhouse with 46, P1 Powerhouse with 43 and then P2 Powerhouse with 21 broken panes. Based on a % of broken glass panes / powerhouse, the order changes with P1 Powerhouse having the greatest % of broken panes (75%), then followed by P4 Powerhouse (74%), P3 Powerhouse (67%) and then P2 Powerhouse (53%) with the least broken % of glass panes. (See Illustration 10, below).



On the basis of deteriorated glass putty, the P1 Powerhouse is in the worst condition, with 100% of the windows with severely dried out and / or cracked putty, with pieces falling away on the bottom operator sashes of the windows. P4 Powerhouse fares better with 23% of the windows with severely dried out and / or cracked window putty and the balance of the windows that appear to be simply dried out but not severely cracked. In the P2 Powerhouse, only 3 windows appeared to be in severe condition with the balance dried out and cracking becoming apparent. In the P3 Powerhouse, 68% of the windows inspected appeared to be dried out with cracking becoming apparent with the balance of the windows with no cracking apparent.

Most of the paint finish on the window frames and sashes inspected in the powerhouses appear to be in good condition with the exception of P1 Powerhouse, which the primer coat is showing through in localized areas on most of the windows.

For unknown reasons, P3 has the largest number of windows with missing chains (31) and there are 8 windows that appear to have sloppy or loose hinges. P1 Powerhouse has 15 windows that appear to have sloppy or loose hinges and 6 windows are missing chains on the operator windows and 19 operator windows have rope pulls in lieu of chain. P4 Powerhouse hinges appear to be good condition and 18 windows were observed with missing chains and 3 windows with rope pulls in lieu of chain. P2 has 3 windows with sloppy or loose hinges and 14 windows were observed with missing chains and 3 windows with rope pulls in lieu of chain.

P1 to P3 appear to have the most light cracking occurring at the exterior and interior sides of the window sills, more than likely due to the lack of caulking or sealants and sills damaged from weathering. Moisture is more than likely entering into these cracks and seasonal freeze / thaw cycles could possibly make the cracks worse over time.

A small number of windows have missing wall and or frame fasteners but do not pose a window-structural concern.

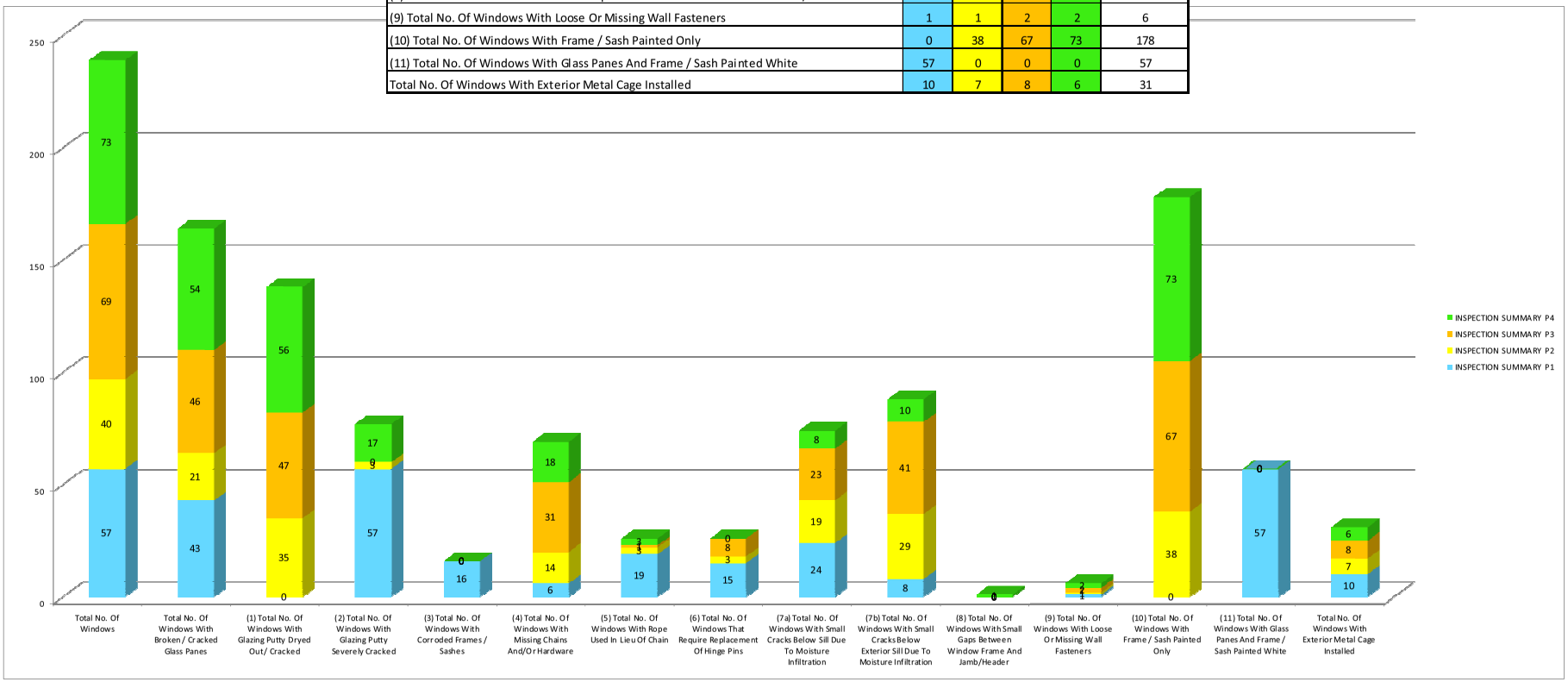
From a window performance standpoint, the windows have stood up very well over the years, with the service life of the windows reaching between 69 to 83 years, which is unheard of today.

From a safety standpoint, the inherent design of the windows using ¼" georgian wireglass held in place with glazing clips and window putty should prevent any glass from falling onto workers below. Any cracked glass panes are being held intact due to the georgian wireglass and the glazing clips are holding the glass panes in the sashes with the window putty providing a seal.

From a design standpoint, the window ventilating operators are cumbersome and tricky to use and the original windows do not have screens built in to keep birds and insects out. A small % of windows on each powerhouse have been retrofitted with exterior screen cages as a result.

ILLUSTRATION 11:

INSPECTION SUMMARY					
INSPECTION ITEM	**P1**	**P2**	**P3**	**P4**	**TOTALS**
Total No. Of Windows	57	40	69	73	239
Total No. Of Windows With Broken / Cracked Glass Panes	43	21	46	54	164
(1) Total No. Of Windows With Glazing Putty Dryed Out / Cracked	0	35	47	56	138
(2) Total No. Of Windows With Glazing Putty Severely Cracked	57	3	0	17	77
(3) Total No. Of Windows With Corroded Frames / Sashes	16	0	0	0	16
(4) Total No. Of Windows With Missing Chains And/Or Hardware	6	14	31	18	69
(5) Total No. Of Windows With Rope Used In Lieu Of Chain	19	3	1	3	26
(6) Total No. Of Windows That Require Replacement Of Hinge Pins	15	3	8	0	26
(7a) Total No. Of Windows With Small Cracks Below Sill Due To Moisture Infiltration	24	19	23	8	74
(7b) Total No. Of Windows With Small Cracks Below Exterior Sill Due To Moisture Infiltration	8	29	41	10	88
(8) Total No. Of Windows With Small Gaps Between Window Frame And Jamb/Header	0	0	0	1	1
(9) Total No. Of Windows With Loose Or Missing Wall Fasteners	1	1	2	2	6
(10) Total No. Of Windows With Frame / Sash Painted Only	0	38	67	73	178
(11) Total No. Of Windows With Glass Panes And Frame / Sash Painted White	57	0	0	0	57
Total No. Of Windows With Exterior Metal Cage Installed	10	7	8	6	31



5.0 Recommendations

Consideration for the recommendations presented in this report should be based on powerhouse, budget constraints, repair costs to maintain existing windows and most importantly, worker's safety.

It is recommended to instigate one of the options presented below immediately for the P1 Powerhouse and in the interim period take necessary action / precautions when attempting to operate the ventilating windows in the powerhouse. For those windows in the P1 Powerhouse inspected and found to require replacement of hinge hardware, it is recommended for the owner to consider tagging them, "Caution, window unsafe to operate", or, "Window unsafe to operate – leave window in closed or open position" until remedial work is completed.

To complete required maintenance to the windows, the same amount of scaffolding and preparation work would be required to replace or rework the windows, and there would be less onsite time and labour to remove and rework the existing windows than to make required repairs to the existing windows while they are in place. The existing window mounting angles and frames appear to be in good condition; the windows could be brought up to original specification by replacing broken glass panes and window putty. The operator window hardware can be replaced, including the old chains, ropes, and hinges. Regardless of which option is chosen, the existing window sills should be patched where there is cracking caused from moisture infiltration to prevent future maintenance / repair costs.

It is also recommended to instigate a window maintenance repair program for remaining plants, P2, P3 and P4. The general condition of the windows in these remaining plants only justifies minor window repairs as per deficiencies identified in the individual plant inspection data tables.

Based on the field inspections and data collected from them (refer to individual plant inspection data tables), recommendations are summarized as follows:

- **Option 1(a)** - Instigate a comprehensive window-repair program immediately for all windows. Work includes removing existing window sashes from the frames on the interior side of the powerhouse and rework them, including replacing broken glazing and removing and installing new window putty to all lites and reinstalling sashes in existing window frames. Replace missing chain pulls and replace existing rope pulls with chain pulls, rebuild worn out hinges and patch /repair exterior sills where cracked and caulk around all exterior window frames. All operator windows are recommended to be prioritized for rework as they are in the worst condition.

- **Option 1(b)** – Provide maintenance repair work to existing windows to extend window life-span 5 years or more on windows indentified by owner. Scope of work is based on individual window inspection results for each plant that includes removing existing window sashes from the frames on the interior side of the powerhouse and complete repairs to them. Repairs include replacing broken glazing as required and removing and installing new window putty to all lites on windows identified as having 'window putty severely cracked with pieces falling away', install new chain pulls where they are missing and replace existing rope pulls with chain pulls, replace hinge pins and tighten or replace missing wall fasteners where indicated.

  Remove a random sampling of remaining operator-sashes from each elevation and inspect condition of original hinge-pins not identified in inspection data sheets (the original hinge pins not identified as being modified or in obvious need of repair are not readily available for visual inspection due to being concealed). Monitor and reinspect remaining windows within 5 years to determine priority of reworking remaining windows

- **Option 2(a)** – Instigate a replacement window program immediately with Jeldwin PVC thermal windows, as used on P2 – Upper Bonnington. This option includes removing existing window sashes and window mounting frames on the interior side of the powerhouses and disposing of them off site. All operator windows are recommended to be prioritized for rework as they are in

the worst condition. Patch / repair exterior sills where cracked as the windows are removed from the interior-side of the powerhouses.

- **Option 2(b)** - Instigate a replacement window program immediately with Kalwall thermal windows (refer to attached documentation). This option includes removing existing window sashes and window mounting frames on the interior side of the powerhouses and disposing of them off site. All operator windows are recommended to be prioritized for rework as they are in the worst condition. Patch / repair exterior sills where cracked as the windows are removed from the interior-side of the powerhouses.

Recommended options for each powerhouse are summarized below:

Lower Bonnington (P1):

- Option 1(a) - Instigate a comprehensive window-repair program immediately for all windows.
- Option 2(a) – Instigate a replacement window program immediately with Jeldwin PVC thermal windows.
- Option 2(b) - Instigate a replacement window program immediately with Kalwall thermal windows.

Upper Bonnington (P2):

- Option 1(b) – Provide maintenance repair work to existing windows to extend window life-span 5 years or more on windows indentified by owner.

South Slocan (P3):

- Option 1(b) – Provide maintenance repair work to existing windows to extend window life-span on windows indentified by owner.

Corra Linn (P4):

- Option 1(b) – Provide maintenance repair work to existing windows to extend window life-span on windows indentified by owner.

6.0 Budget Cost Estimates for Recommendations

6.1 Introduction:

Budget Cost Estimates for recommendations have been produced for the four powerhouses and recommended options, including Option 1(a) - Instigate a comprehensive window-repair program immediately for all windows, Option 2(a) – Instigate a replacement window program immediately with Jeldwin PVC thermal windows as installed in the original P2 – 1907 Powerhouse, Option 1(b) – Provide minimal maintenance repair work to existing windows to extend window life-span 5 – 10 years on windows indentified by owner, and Option 2(b) - Instigate a replacement window program immediately with Kalwall thermal windows (industrial / commercial type windows).

Due to the extent of work required and time required to complete total remediation of existing windows at one time in any of the powerhouses, it is impractical to assume scheduling can be accomplished in one mobilization to complete this task. Crane lockout would be required to complete work on the upper level of windows and some windows may require power lockout of the hi-voltage lines that pass through some of the windows.

Due to the inherent design of the existing windows, they must be unbolted and removed from the interior of the powerhouses. All remedial work can be accomplished from the interior side of the powerhouses, including patching window sills and caulking. Use of the powerhouse crane and crane operator cannot be utilized for lowering and raising the upper level windows due to the scaffolding and hoarding-protection requirements. Instead, a pulley system can be utilized in the scaffolding budget to accomplish this task.

6.2 Lower Bonnington, P1:

6.2.1 Option 1(a) - Instigate a comprehensive window-repair program immediately for all windows:

For budgeting purposes, a unit cost per window has been created based on completing maximum amount of work within a 2-week window for P1 Powerhouse. It is estimated 12 windows (4 rows x 3 level of windows) can be removed, sent out of house for rework and reinstalled within a 2-week period. The powerhouse cranes would be required to be locked out during these time periods. The scaffolding / hoarding-protection would be stored on site and erected to continue work on next section of windows, schedule permitting.

6.2.2 Option 2(a) – Instigate a replacement window program immediately with Jeldwin PVC thermal windows:

Various replacement options were considered for the powerhouses, including using replacement PVC thermal windows. This type of replacement window is presented here as an option because the owner used these recently as a replacement window in the original P2 Powerhouse built in 1907 (see picture 32). Wilmar, the manufacturer of the replacement window used in the original P2 Powerhouse, is owned by Jeldwin Windows. Jeldwin has provided a proposal to use their product using awning-style operators for ventilation with remote operation. The windows have a screen built in to keep birds and insects out (refer to Section 7.1 in this report for product information: Replace Existing Windows with Jeldwin PVC thermal windows).

Similarly to Option 1(a), a unit cost per window has been created based on completing maximum amount of work in a 2-week window in P1 Powerhouse.

6.2.3 Option 2(b) - Instigate a replacement window program immediately with Kalwall thermal windows:

The Kalwall window (www.Kalwall.com) is considered a viable option as a replacement window. It is a heavy-duty window designed to be used in this type of environment with large window openings. Kalwall is a reputable manufacturer of new and replacement building translucent systems that most resembles the existing windows using current window technology. The window panels are translucent, diffusing the sunlight and reducing radiant heat but allowing natural light to enter the building. The operator windows have an option for a remote open / closing device, thereby eliminating the need for manual operation (refer to Section 7.2 in this report for product information: Replace Existing Windows with Kalwall thermal windows).

Again, as in Option 1(a), a unit cost per window has been created based on completing maximum amount of work in a 2-week window in P1 Powerhouse.

6.3 Upper Bonnington (P2), South Slocan (P3) and Corra Linn (P4:

6.3.1 Option 1(b) – Provide maintenance repair work to existing windows to extend window life-span 5 years or more on windows indentified by owner:

Repairs include replacing broken glazing as required and removing and installing new window putty to all lites on windows identified as having 'window putty severely cracked with pieces falling away', install new chain pulls where they are missing and replace existing rope pulls with chain pulls, replace hinge pins where identified and tighten or replace missing wall fasteners where indicated.

Remove a random sampling of remaining operator-sashes from each elevation at same time when repairing other local windows and inspect condition of original hinge-pins not identified in inspection data sheets.

6.4 Budget Cost Estimate Methodology:

6.4.1 Basis of Estimate:

The following budget cost estimate summaries are based on information available at the time of preparation. While it is believed that the information and estimates contained in this report are reliable and subject to the qualifications and exclusions stated, the actual cost of the work may be subject to factors over which Redwood Engineering Ltd. has no control. The budget cost estimates are based on Redwood Engineering Ltd. experience and on data supplied by others. These conceptual level estimates are intended exclusively for FortisBC for the P1 – P4 Powerhouse windows as detailed on attached drawings supplied by the owner:

B-28 P1 – Lower Bonnington Powerhouse
J-148 P2 – Upper Bonnington Powerhouse
C-100 P3 – South Slocan Powerhouse
F-135 P4 – Corra Linn Powerhouse

6.4.2 Estimate Type & Accuracy:

The estimates are conceptual only, and not considered suitable for the appropriation of funds. Average pricing to repair or replace a single window in P1 powerhouse for each option was developed, assuming an operator-style window. All costs are expressed in current quarter and year Canadian dollars and are based on the use of new equipment and materials, except where specifically identified. Escalation and interest during construction are not included. Estimates assume GST is extra.

6.4.3 General:

The estimate covers the costs of supply and executing the project using Redwood Engineering, local contractors and FortisBC personnel for project and construction management. It is assumed clear and easy access to all construction areas. It is recommended that FortisBC assess the Owner's contingency requirements for these items.

The cost estimate is based on the following information as available:

- civil plans, section and elevation drawings from FortisBC
- budget quotations or historical pricing for steel and bulk materials and electrical work

6.4.4 Direct Costs:

Quantity takeoffs are based on "neat" line quantities from field measurements and use of existing drawings. Allowances for waste and details have been included in the estimate price calculations. The quantity estimates were performed by an experienced estimator.

Costs are estimated based on pricing the installation, material, and equipment cost component for each item using industry standard labour manhour units, budget material quotations and/or recent project history. The costs include provincial taxes and an allowance for delivery. Material contingency of 10% is included.

Direct costs are based on information collected from area contractors, historical data and published data. These costs have been assessed and adjusted based on inflation, local conditions, and experience.

Foreign currency was not a consideration in this study.

6.4.5 Hourly Rate:

The local union contract field labour rate of $90.00 per man-hour is based on an eight hour day, five day per week work schedule. This rate includes base rate, union loads, government loads, small tools, consumables, office overhead, supervision, PAPR, productivity adjustment, craft orientation, LOA, safety, temporary building maintenance, janitorial services, temporary power, temporary utilities, tool crib, vehicles and profit.

6.4.6 Overhead Costs:

- Allowance for Construction / Project Management of 10% of total direct costs is included.

- Allowance for engineering, design and drafting of 10% of total direct costs is included.

- Allowance for Owner's contingency of 10% of total direct costs is included.

6.4.7 Qualifications / Exclusions:

No scope was identified in this area; the estimates are subject to the following qualifications and exclusions.

- Owner's contingency to cover potential changes in project scope.
- Lunchroom and first aid facilities will be by FortisBC at no cost to the project.
- Refurbish of existing equipment.
- Salvage value of removed equipment or any unused materials or equipment.
- Force majeure.
- Escalation.
- Financing costs or interest during construction.
- Overtime premium.

The estimates assume completing maximum amount of work within a 2-week schedule and having the plant cranes locked out during this time period. Scaffolding, general site clean-up and mobile equipment allowances are established on a historical factor based on project manhours.

6.4.8 Budget Estimate Summary (see Section 6.5 for estimate summary and estimate details)

6.5 Estimate Summary and Details:

TABLE 2: Estimate Summary

RECOMMENDED OPTIONS	POWERHOUSE LOCATION	BUDGET PRICE (AVERAGE $ / WINDOW)	TOTAL BUDGET PRICE TO COMPLETE WORK	PROS	CONS
Option 1(a) - Instigate a comprehensive window-repair program immediately for all windows	Lower Bonnington (P1)	$ 10,362.00	$ 590,636.00	- Most initial cost-effective capital outlay. - Existing window frames appear to be good condition. - With remedial work completed in Option 1(a), window life expectancy is expected to be extended 25 years, before future maintenance is required. - Existing window design has stood up to the test of time. - Georgian-wire glass is considered to be a safety glass with fire-rating properties. Smaller, individual glass lites remain intact when cracked, providing a safety factor for workers below. - Powerhouses maintain original heritage.	- Old window technology; little or no R-Value in existing windows. - More onsite time required to remove and send existing windows out of house for rework and to wait for return. - Not maintenance-free; broken window panes difficult and costly to replace and window frames require to be periodically repainted. - Window operators are manually operated.
Option 1(b) – Provide maintenance repair work to existing windows to extend window life-span 5 years or more on windows indentified by owner.	Upper Bonnington (P2) South Slocan (P3) Corra Linn (P4)	$ 3,770.00 $ 3,131.00 $ 2,869.00	$ 45,243.00 $ 103,324.00 $ 106,139.00		
Option 2(a) – Instigate a replacement window program immediately with Jeldwin PVC thermal windows	Lower Bonnington (P1)	$ 11,025.00	$ 628,382.00	- Windows installed in the P2, 1907 original powerhouse; quality and user-friendliness history is known. - Windows match those installed in the P2, 1907 original powerhouse. - Windows offer latest R-value available with current window technology. - Glass is dry-glazed, with rubber gaskets, allowing easier and faster replacement than replacing individual lites that are puttied in place. - Remote, automatic push-button controls to operate ventilating windows. - Less onsite time for removal of existing windows and installation of new windows.	- PVC gets brittle in extreme cold and tends to fracture when impacted, and gets softer in extreme heat and tends to sag / bend along horizontal members. - PVC standard colour is white and tends to 'yellow' over time and break down easier due to exposure to UV light (for custom colours, painted PVC is surface-applied only). - Thermal 2-pane glass panes are 1-piece construction; not individual lites. The glass panes have internal, simulated individual lites (Window sizes in P2 1907 powerhouse have large, 1-piece glass units that can be seen 'pulsating' over the large surface area caused by the high frequency vibration from the generators). - Windows not designed for industrial use; thermal 2-pane glass units are not designed to resist impacts and are not shatterproof. Large size glass required for the powerhouse windows could potentially break into large pieces, causing potential hazard for workers. - Thermal glass panes have limited life-span, usually up to 10 years average before leaks become present, causing internal 'hazing' and moisture between the glass panes.
Option 2(b) - Instigate a replacement window program immediately with Kalwall thermal windows	Lower Bonnington (P1)	$ 12,572.00	$ 716,562.00	- Windows designed for industrial use. - Windows most closely resembles existing window design, using individual translucent panels to resemble existing window lites. - Thermal R-Values ranging from R2-R20. - Panels are translucent – no glass; less radiant heat and glare than in glass system. - Shatterproof material, if the Kalwall is punctured, repairs can be made with a patch over the damaged cell and panel left in place. - Panels have passed Hurricane testing. - Low maintenance material; all that is required is regular rain to keep the panel system clean. - Life expectancy, including reliability to exceed 50 years. - Anti-Terrorism Compliant, blast resistant construction. - Remote operation with a push button or switch to operate ventilating panels. - Less onsite time for removal of existing windows and installation of new windows. - Windows are factory-installed.	- Higher initial capital outlay. - Longer delivery time than regular PVC windows.

Redwood engineering ltd.

		Labour Rate / Hr :	90.00
JOB:	P1 - P4 POWERHOUSE WINDOWS ESTIMATE DETAILS	*Avg. Crew Size :*	3.00
		Weeks :	0.003175
WORK:	Option 1 (a): Window Repair Program, P1 Powerhouse	*ESTIMATE #:*	09E94 P2

SUMMARY	*NET QUANT.*	*U.*	*@*	*MAT.**	*HRS/UNIT*	*TOTAL HRS*	*SUB TOTAL*	*TOTAL*
Scope:				-		-		-
Remove and send existing window sashes				-		-		-
out of house for rework and reinstall into				-		-		-
window frames, including replacing broken				-		-		-
glass panes and removing and installing ne				-		-		-
window pane putty.				-		-		-
Average cost/window, based on scaffolding for				-		-		-
3 levels of windows (12 in total at one time)				-		-		-
				-		-		-
Scaffolding, including pulley-lifting system				-		-		-
for lowering and raising windows, protection				-		-		-
for existing switchgear below:	*1.00*	*ea*	*1,200.00*	*1,200.00*		-		*1,200.00*
				-		-		-
Remove existing window:				-		-		-
Weld lifting lugs onto window	*2.00*	*ea*	*25.00*	*50.00*	*0.67*	*1.34*		*170.60*
Cut/Grind off existing nuts and remove				-		-		-
bolts holding window sash in place (Avg.	*14.00*	*ea*	*2.00*	*28.00*	*0.15*	*2.10*		*217.00*
				-		-		-
Lower window from opening and prepare				-		-		-
for pickup by window company:	*1.00*	*ea*	*20.00*	*20.00*	*1.00*	*1.00*		*110.00*
				-		-		-
Install temporary plywood to window openin	*1.00*	*ea*	*100.00*	*100.00*	*4.00*	*4.00*		*460.00*
				-		-		-
Rework exist. window (average # panes/sas				-		-		-
Remove existing window putty from pane	*26.00*	*ea*		-		-	*1,170.00*	*1,170.00*
Replace broken glass panes	*5.00*	*ea*		-		-	*250.00*	*250.00*
Install glazing clips & new window putty	*26.00*	*ea*		-		-	*949.00*	*949.00*
Replace hinge-pins on operator sashes	*4.00*	*ea*		-		-	*760.00*	*760.00*
				-		-		-
Repair cracks in window sills:				-		-		-
Grind/chip cracks to accept new patching	*1.00*	*ea*	*15.00*	*15.00*	*1.00*	*1.00*		*105.00*
Apply SIKA skim coat to sill surface	*1.00*	*ea*	*30.00*	*30.00*	*1.00*	*1.00*		*120.00*
Apply new sill flashing:	*1.00*	*ea*	*30.00*	*30.00*	*0.75*	*0.75*		*97.50*
Caulk around exterior of window mounting				-		-		-
angle frame	*1.00*	*ea*	*25.00*	*25.00*	*0.50*	*0.50*		*70.00*
				-		-		-
Weld studs onto exist. Mounting angle to				-		-		-
receive window sash from interior side	*14.00*	*ea*	*2.00*	*28.00*	*0.40*	*5.60*		*532.00*
				-		-		-
Install reworked window:				-		-		-
Receive / handle reworked window	*1.00*	*ea*		-	*2.00*	*2.00*		*180.00*
Lift and install reworked sash / install nuts	*1.00*	*ea*	*50.00*	*50.00*	*6.00*	*6.00*		*590.00*
				-		-		-
				-		-		-
Install chain pulls:				-		-		-
Install new latching mechanisims	*1.00*	*ea*	*50.00*	*50.00*	*2.00*	*2.00*		*230.00*
Install new chain pulls & accessories	*1.00*	*ea*	*100.00*	*100.00*	*3.00*	*3.00*		*370.00*
				-		-		-
General Mobe / Equipment Allowance:	*1.00*	*lot*	*50.00*	*50.00*	*2.00*	*2.00*		*230.00*
				-		-		-
Cleanup / Demobe:	*1.00*	*lot*		-	*2.00*	*2.00*		*180.00*
				-		-		-
				-		-		-
MATERIAL CONTINGENCY (10%):				*177.60*		-		*177.60*
PST (7% MATERIAL):				*136.75*		-		*136.75*
SUBTOTAL (DIRECT COSTS):				*2,090.35*		*34.29*		*8,305.45*
CONSTRUCTION MANAGEMENT (7% SUBTOTAL):				-		-		*146.32*
PROJECT MANAGEMENT (3% SUBTOTAL):				-		-		*249.16*
ENGINEERING, DESIGN & DRAFTING (10%):				-		-		*830.55*
OWNER'S CONTINGENCY (10% SUBTOTAL):				-		-		*830.55*
SUBTOTAL (INDIRECT COSTS):				-		-		*2,056.58*
TOTAL COST / UNIT:				*$ 4,180.70*		*34.29*	*$ 3,129.00*	***$ 10,362.03***

INDIRECT COSTS

Total budget cost to repair all windows -P1 Powerhouse: 57 windows x 10,362.03 = **$590,635.74**

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		Labour Rate / Hr :	90.00
JOB:	P1 - P4 POWERHOUSE WINDOWS ESTIMATE DETAILS	Avg. Crew Size :	3.00
		Weeks :	0.013321296
WORK:	Option 1 (b): Window Repair Program, Upper Bonnington (P2)	ESTIMATE #:	09E94 P2

SUMMARY	NET QUANT.	U.	@	MAT.*	HRS/UNIT	TOTAL HRS	SUB TOTAL	TOTAL
Scope: Provide maintenance repair work				-		-		-
to existing windows to extend window lifespan				-		-		-
on windows identified by owner (12 windows).				-		-		-
				-		-		-
Remove 3 existing window sashes				-		-		-
for rework and reinstall into				-		-		-
window frames, including replacing broken				-		-		-
glass panes and removing and installing new				-		-		-
window pane putty, replace hinges and chains				-		-		-
on remaining 9 windows, install new chains/hardw				-		-		-
on existing windows while in place in opening.								
				-		-		-
Scaffolding, 1 month rental only, including pulley-lifting system				-		-		-
for lowering and raising windows, protection				-		-		-
for existing switchgear below:	1.00	lot		-		-	13,000.00	13,000.00
				-		-		-
Remove existing windows (3 required for removal				-		-		-
Weld lifting lugs onto window	6.00	ea	25.00	150.00	0.67	4.02		511.80
Cut/Grind off existing nuts and remove				-		-		-
bolts holding window sash in place (Avg. #)	42.00	ea	2.00	84.00	0.15	6.30		651.00
				-		-		-
Lower window from opening and prepare				-		-		-
for pickup by window company:	3.00	ea	20.00	60.00	1.00	3.00		330.00
				-		-		-
Install temporary plywood to window opening	3.00	ea	100.00	300.00	4.00	12.00		1,380.00
				-		-		-
Rework exist. windows:				-		-		-
Replace hinge-pins on operator sashes	6.00	ea		-		-	1,140.00	1,140.00
Remove existing window putty from panes	90.00	ea		-		-	4,050.00	4,050.00
Replace broken glass panes	8.00	ea		-		-	400.00	400.00
Install glazing clips & new window putty	3.00	ea		-		-	109.50	109.50
				-		-		-
Repair cracks in window sills:				-		-		-
Grind/chip cracks to accept new patching	3.00	ea	15.00	45.00	1.00	3.00		315.00
Apply SIKA skim coat to sill surface	3.00	ea	30.00	90.00	1.00	3.00		360.00
Apply new sill flashing:	3.00	ea	30.00	90.00	0.75	2.25		292.50
Caulk around exterior of window mounting				-		-		-
angle frame	3.00	ea	25.00	75.00	0.50	1.50		210.00
				-		-		-
Weld studs onto exist. Mounting angle to				-		-		-
receive window sash from interior side	42.00	ea	2.00	84.00	0.40	16.80		1,596.00
				-		-		-
Install reworked windows (3):				-		-		-
Receive / handle reworked window	3.00	ea		-	2.00	6.00		540.00
Lift and install reworked sash / install nuts	3.00	ea	50.00	150.00	6.00	18.00		1,770.00
				-		-		-
Install chain pulls to existing windows in openings:				-		-		-
Install new latching mechanisims	12.00	ea	50.00	600.00	2.00	24.00		2,760.00
Install new chain pulls & accessories	12.00	ea	100.00	1,200.00	3.00	36.00		4,440.00
				-		-		-
General Mobe / Equipment Allowance:	1.00	lot	1,200.00	1,200.00	4.00	4.00		1,560.00
				-		-		-
Cleanup / Demobe:	1.00	lot		-	4.00	4.00		360.00
MATERIAL CONTINGENCY (10%):				412.80		-		412.80
PST (7% MATERIAL):				317.86		-		317.86
SUBTOTAL (DIRECT COSTS):				4,858.66		143.87		36,506.46
INDIRECT COSTS — CONSTRUCTION MANAGEMENT (7% SUBTOTAL):				-		-		340.11
PROJECT MANAGEMENT (3% SUBTOTAL):				-		-		1,095.19
ENGINEERING, DESIGN & DRAFTING (10%):				-		-		3,650.65
OWNER'S CONTINGENCY (10% SUBTOTAL):				-		-		3,650.65
SUBTOTAL (INDIRECT COSTS):				-		-		8,736.59
TOTAL COST :				$ 9,717.31		143.87	$ 18,699.50	**$ 45,243.05**

Redwood engineering ltd.

JOB:	P1 - P4 POWERHOUSE WINDOWS ESTIMATE DETAILS	Labour Rate / Hr :	90.00
		Avg. Crew Size :	3.00
		Weeks :	0.032225
WORK:	Option 1 (b): Window Repair Program, South Slocan (P3)	ESTIMATE #:	09E94 P2

SUMMARY	NET QUANT.	U.	@	MAT.*	HRS/UNIT	TOTAL HRS	SUB TOTAL	TOTAL
Scope: Provide maintenance repair work				-		-		-
to existing windows to extend window lifespan				-		-		-
on windows indentified by owner (33 windows)				-		-		-
				-		-		-
Remove 7 existing window sashes				-		-		-
for rework and reinstall into				-		-		-
window frames, including replacing broken				-		-		-
glass panes and removing and installing new				-		-		-
window pane putty, replace hinges				-		-		-
Install new chains / hardware				-		-		-
on existing windows while in place in opening.								
				-		-		-
Scaffolding, 3 month rental only, including pulley-lifting system				-		-		-
for lowering and raising windows, protection				-		-		-
for existing switchgear below:	1.00	lot		-		-	24,596.00	24,596.00
				-		-		-
Remove existing windows (3 to be removed):				-		-		-
Weld lifting lugs onto window	14.00	ea	25.00	350.00	0.67	9.38		1,194.20
Cut/Grind off existing nuts and remove				-		-		-
bolts holding window sash in place (Avg. #)	98.00	ea	2.00	196.00	0.15	14.70		1,519.00
				-		-		-
Lower window from opening and prepare				-		-		-
for pickup by window company:	7.00	ea	20.00	140.00	1.00	7.00		770.00
				-		-		-
Install temporary plywood to window opening	7.00	ea	100.00	700.00	4.00	28.00		3,220.00
				-		-		-
Rework exist. windows:				-		-		-
Replace hinge-pins on operator sashes	14.00	ea		-		-	2,660.00	2,660.00
Remove existing window putty from panes	245.00	ea		-		-	11,025.00	11,025.00
Replace broken glass panes	42.00	ea		-		-	2,100.00	2,100.00
Install glazing clips & new window putty	7.00	ea		-		-	255.50	255.50
Repair cracks in window sills:				-		-		-
Grind/chip cracks to accept new patching	7.00	ea	15.00	105.00	1.00	7.00		735.00
Apply SIKA skim coat to sill surface	7.00	ea	30.00	210.00	1.00	7.00		840.00
Apply new sill flashing:	7.00	ea	30.00	210.00	0.75	5.25		682.50
Caulk around exterior of window mounting				-		-		-
angle frame	7.00	ea	25.00	175.00	0.50	3.50		490.00
				-		-		-
Weld studs onto exist. Mounting angle to				-		-		-
receive window sash from interior side	98.00	ea	2.00	196.00	0.40	39.20		3,724.00
				-		-		-
Install reworked windows (3):				-		-		-
Receive / handle reworked window	7.00	ea		-	2.00	14.00		1,260.00
Lift and install reworked sash / install nuts	7.00	ea	50.00	350.00	6.00	42.00		4,130.00
Install chain pulls to existing windows in openings:				-		-		-
Install new latching mechanisims	31.00	ea	50.00	1,550.00	2.00	62.00		7,130.00
Install new chain pulls & accessories	31.00	ea	100.00	3,100.00	3.00	93.00		11,470.00
				-		-		-
General Mobe / Equipment Allowance:	2.00	lot	1,200.00	2,400.00	4.00	8.00		3,120.00
				-		-		-
Cleanup / Demobe:	2.00	lot		-	4.00	8.00		720.00
				-		-		-
				-		-		-
MATERIAL CONTINGENCY (10%):				968.20		-		968.20
PST (7% MATERIAL):				745.51		-		745.51
SUBTOTAL (DIRECT COSTS):				11,395.71		348.03		83,354.91
INDIRECT COSTS — CONSTRUCTION MANAGEMENT (7% SUBTOTAL):				-		-		797.70
INDIRECT COSTS — PROJECT MANAGEMENT (3% SUBTOTAL):				-		-		2,500.65
INDIRECT COSTS — ENGINEERING, DESIGN & DRAFTING (10%):				-		-		8,335.49
INDIRECT COSTS — OWNER'S CONTINGENCY (10% SUBTOTAL):				-		-		8,335.49
INDIRECT COSTS — SUBTOTAL (INDIRECT COSTS):				-		-		19,969.33
TOTAL COST :				$ 22,791.43		348.03	$ 40,636.50	**$ 103,324.24**

Redwood engineering ltd.

		Labour Rate / Hr :	90.00
JOB:	P1 - P4 POWERHOUSE WINDOWS ESTIMATE DETAILS	Avg. Crew Size :	3.00
		Weeks :	0.04867037
WORK:	Option 1 (b): Window Repair Program, Corra Linn (P4)	ESTIMATE #:	09E94 P2

SUMMARY	NET QUANT.	U.	@	MAT.*	HRS/UNIT	TOTAL HRS	SUB TOTAL	TOTAL
Scope: Provide maintenance repair work				-		-		-
to existing windows to extend window lifespan				-		-		-
on windows indentified by owner (37 windows)				-		-		-
				-		-		-
Remove 16 existing window sashes				-		-		-
for rework and reinstall into				-		-		-
window frames, including replacing broken				-		-		-
glass panes and removing and installing new				-		-		-
window pane putty, replace chains				-		-		-
on existing windows while in place in opening.								
				-		-		-
Scaffolding, 3 month rental only, including pulley-lifting system				-		-		-
for lowering and raising windows, protection				-		-		-
for existing switchgear below:	1.00	lot		-		-	24,596.00	24,596.00
				-		-		-
Remove existing windows (3 required for remova				-		-		-
Weld lifting lugs onto window	32.00	ea	25.00	800.00	0.67	21.44		2,729.60
Cut/Grind off existing nuts and remove				-		-		-
bolts holding window sash in place (Avg. #)	224.00	ea	2.00	448.00	0.15	33.60		3,472.00
				-		-		-
Lower window from opening and prepare				-		-		-
for pickup by window company:	16.00	ea	20.00	320.00	1.00	16.00		1,760.00
				-		-		-
Install temporary plywood to window opening	16.00	ea	100.00	1,600.00	4.00	64.00		7,360.00
				-		-		-
Rework exist. windows:				-		-		-
				-		-		-
Repair cracks in window sills:				-		-		-
Grind/chip cracks to accept new patching	16.00	ea	15.00	240.00	1.00	16.00		1,680.00
Apply SIKA skim coat to sill surface	16.00	ea	30.00	480.00	1.00	16.00		1,920.00
Apply new sill flashing:	16.00	ea	30.00	480.00	0.75	12.00		1,560.00
Caulk around exterior of window mounting				-		-		-
angle frame	16.00	ea	25.00	400.00	0.50	8.00		1,120.00
				-		-		-
Weld studs onto exist. Mounting angle to				-		-		-
receive window sash from interior side	224.00	ea	2.00	448.00	0.40	89.60		8,512.00
				-		-		-
Install reworked windows (16):				-		-		-
Receive / handle reworked window	16.00	ea		-	2.00	32.00		2,880.00
Lift and install reworked sash / install nuts	16.00	ea	50.00	800.00	6.00	96.00		9,440.00
				-		-		-
				-		-		-
Install chain pulls to existing windows in openings:				-		-		-
Install new latching mechanisims	21.00	ea	50.00	1,050.00	2.00	42.00		4,830.00
Install new chain pulls & accessories	21.00	ea	100.00	2,100.00	3.00	63.00		7,770.00
				-		-		-
General Mobe / Equipment Allowance:	2.00	lot	1,200.00	2,400.00	4.00	8.00		3,120.00
				-		-		-
Cleanup / Demobe:	2.00	lot		-	4.00	8.00		720.00
				-		-		-
				-		-		-
MATERIAL CONTINGENCY (10%):				1,156.60		-		1,156.60
PST (7% MATERIAL):				890.58		-		890.58
SUBTOTAL (DIRECT COSTS):				13,613.18		525.64		85,516.78
INDIRECT COSTS — CONSTRUCTION MANAGEMENT (7% SUBTOTAL):				-		-		952.92
INDIRECT COSTS — PROJECT MANAGEMENT (3% SUBTOTAL):				-		-		2,565.50
INDIRECT COSTS — ENGINEERING, DESIGN & DRAFTING (10%):				-		-		8,551.68
INDIRECT COSTS — OWNER'S CONTINGENCY (10% SUBTOTAL):				-		-		8,551.68
INDIRECT COSTS — SUBTOTAL (INDIRECT COSTS):				-		-		20,621.78
TOTAL COST :				$ 27,226.36		525.64	$ 24,596.00	**$ 106,138.56**

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Redwood engineering ltd.

		Labour Rate / Hr :	90.00
JOB:	P1 - P4 POWERHOUSE WINDOWS ESTIMATE DETAILS	*Avg. Crew Size :*	2.00
		Weeks :	0.004123611
WORK:	Option 2 (a): Window Replacement Program, P1 - PVC Windows	*ESTIMATE #:*	09E94 P2

SUMMARY	*NET QUANT.*	*U.*	*@*	*MAT.**	*HRS/UNIT*	*TOTAL HRS*	*SUB TOTAL*	*TOTAL*
Scope:				-		-		-
Remove existing window sashes				-		-		-
and patch and make good existing window				-		-		-
sills, install new windows & remote				-		-		-
operators				-		-		-
				-		-		-
Average cost/window, based on scaffolding for				-		-		-
3 levels of windows (12 in total at one time)				-		-		-
				-		-		-
Scaffolding, including pulley-lifting system				-		-		-
for lowering and raising windows, protection				-		-		-
for existing switchgear below:	*1.00*	*ea*	*1,200.00*	*1,200.00*		-		*1,200.00*
				-		-		-
Remove existing window:				-		-		-
Weld lifting lugs onto window	*2.00*	*ea*	*25.00*	*50.00*	*0.67*	*1.34*		*170.60*
Cut/Grind off existing nuts and remove				-		-		-
bolts holding window sash in place (Avg. #)	*14.00*	*ea*	*2.00*	*28.00*	*0.15*	*2.10*		*217.00*
				-		-		-
Lower window from opening and				-		-		-
remove and dispose off site:	*1.00*	*ea*	*20.00*	*20.00*	*2.00*	*2.00*		*200.00*
				-		-		-
Remove existing mounting angles from				-		-		-
jambs and header & grind off bolts	*1.00*	*lot*	*50.00*	*50.00*	*2.00*	*2.00*		*230.00*
				-		-		-
Disposal Fees (glass and steel frame)	*0.16*	*ton*	*130.00*	*21.19*		-		*21.19*
				-		-		-
				-		-		-
Repair cracks in window sills:				-		-		-
Grind/chip cracks to accept new patching	*1.00*	*ea*	*15.00*	*15.00*	*1.00*	*1.00*		*105.00*
Apply SIKA skim coat to sill surface	*1.00*	*ea*	*30.00*	*30.00*	*1.00*	*1.00*		*120.00*
				-		-		-
				-		-		-
				-		-		-
Install new PVC window:				-		-		-
Ship / Receive / handle new PVC window	*1.00*	*ea*	*100.00*	*100.00*	*4.00*	*4.00*		*460.00*
Lift and install new PVC window	*1.00*	*ea*	*1,805.00*	*1,805.00*	*6.00*	*6.00*		*2,345.00*
Misc. material, fasteners for installation	*1.00*	*ea*	*100.00*	*100.00*		-		*100.00*
Apply new sill flashing:	*1.00*	*ea*	*30.00*	*30.00*	*0.75*	*0.75*		*97.50*
Caulk new window	*1.00*	*ea*	*25.00*	*25.00*	*0.50*	*0.50*		*70.00*
						-		-
						-		-
				-		-		-
Install automatic opener:				-		-		-
Install Sentry II HS Motor System	*1.00*	*ea*	*919.00*	*919.00*		-		*919.00*
wire and hookup motor system	*1.00*	*ea*	*300.00*	*300.00*	*8.00*	*8.00*		*1,020.00*
				-		-		-
General Mobe Equipment Allowance:	*1.00*	*lot*	*363.70*	*363.70*		-		*363.70*
				-		-		-
Cleanup / Demobe:	*1.00*	*lot*		-	*1.00*	*1.00*		*90.00*
				-		-		-
				-		-		-
				-		-		-
				-		-		-
MATERIAL CONTINGENCY (10%):				*505.69*		-		*505.69*
PST (7% MATERIAL):				*389.38*		-		*389.38*
SUBTOTAL (DIRECT COSTS):				*5,951.96*		*29.69*		*8,624.06*
INDIRECT COSTS — *CONSTRUCTION MANAGEMENT (7% SUBTOTAL):*				-		-		*416.64*
PROJECT MANAGEMENT (3% SUBTOTAL):				-		-		*258.72*
ENGINEERING, DESIGN & DRAFTING (10%):				-		-		*862.41*
OWNER'S CONTINGENCY (10% SUBTOTAL):				-		-		*862.41*
SUBTOTAL (INDIRECT COSTS):				-		-		*2,400.17*
TOTAL COST:				*$ 11,903.92*		*29.69*	*$ -*	***$ 11,024.23***

Total budget cost to replace all windows -P1 Powerhouse: 57 windows x 11,024.23 = **$628,381.35**

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Redwood engineering ltd.

		Labour Rate / Hr :	90.00
JOB:	P1 - P4 POWERHOUSE WINDOWS ESTIMATE DETAILS	Avg. Crew Size :	2.00
		Weeks :	0.002561111
WORK:	Option 2 (b): Window Replacement Program, P1 - Kalwall Windows	ESTIMATE #:	09E94 P2

SUMMARY	NET QUANT.	U.	@	MAT.*	HRS/UNIT	TOTAL HRS	SUB TOTAL	TOTAL
Scope:				-		-		-
Remove existing window sashes				-		-		-
and patch and make good existing window				-		-		-
sills, install new windows & remote				-		-		-
operators				-		-		-
				-		-		-
Average cost/window, based on scaffolding for				-		-		-
3 levels of windows (12 in total at one time)				-		-		-
				-		-		-
Scaffolding, including pulley-lifting system				-		-		-
for lowering and raising windows, protection				-		-		-
for existing switchgear below:	1.00	ea	1,200.00	1,200.00		-		1,200.00
				-		-		-
Remove existing window:				-		-		-
Weld lifting lugs onto window	2.00	ea	25.00	50.00	0.67	1.34		170.60
Cut/Grind off existing nuts and remove				-		-		-
bolts holding window sash in place (Avg.	14.00	ea	2.00	28.00	0.15	2.10		217.00
				-		-		-
Lower window from opening and				-		-		-
remove and dispose off site:	1.00	ea	20.00	20.00	2.00	2.00		200.00
				-		-		-
Remove existing mounting angles from				-		-		-
jambs and header & grind off bolts	1.00	lot	50.00	50.00	2.00	2.00		230.00
				-		-		-
Disposal Fees (glass and steel frame)	0.16	ton	130.00	21.19		-		21.19
				-		-		-
				-		-		-
Repair cracks in window sills:				-		-		-
Grind/chip cracks to accept new patching	1.00	ea	15.00	15.00	1.00	1.00		105.00
Apply SIKA skim coat to sill surface	1.00	ea	30.00	30.00	1.00	1.00		120.00
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
Install new Kalwall window:				-		-		-
Supply and install new Kalwall Window						-		-
including all labour and materials (incluc						-		-
wall-mount actuator, fasteners, sealants &				-		-		-
flashing (direct by manufacturer):	1.00						6,147.50	6,147.50
				-		-		-
wire and hookup motor system	1.00	ea	300.00	300.00	8.00	8.00		1,020.00
				-		-		-
				-		-		-
General Mobe Equipment Allowance:	1.00	lot	225.89	225.89		-		225.89
				-		-		-
Cleanup / Demobe:	1.00	lot		-	1.00	1.00		90.00
				-		-		-
				-		-		-
				-		-		-
				-		-		-
MATERIAL CONTINGENCY (10%):				194.01		-		194.01
PST (7% MATERIAL):				149.39		-		149.39
SUBTOTAL (DIRECT COSTS):				2,283.47		18.44		10,090.57
INDIRECT COSTS — CONSTRUCTION MANAGEMENT (7% SUBTOTAL):				-		-		159.84
INDIRECT COSTS — PROJECT MANAGEMENT (3% SUBTOTAL):				-		-		302.72
INDIRECT COSTS — ENGINEERING, DESIGN & DRAFTING (10%):				-		-		1,009.06
INDIRECT COSTS — OWNER'S CONTINGENCY (10% SUBTOTAL):				-		-		1,009.06
INDIRECT COSTS — SUBTOTAL (INDIRECT COSTS):				-		-		2,480.68
TOTAL COST:				$ 4,566.95		18.44	$ 6,147.50	**$ 12,571.25**

Total budget cost to replace all windows -P1 Powerhouse: 57 windows 12,571.25 = **$716,561.22**

7.0 Budget Supplier Quotations

7.1 Option 2(a) – Replace Existing Windows with Jeldwin PVC thermal windows:

(Supply only)

Phone:

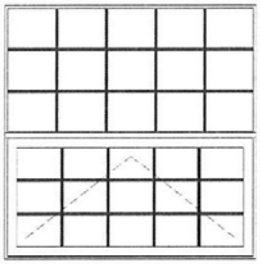
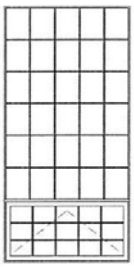
JELD-WEN WINDOWS & DOORS

QUOTE BY: Tyler Paracy
SOLD TO: -

QUOTE #: JTOZ00528
SHIP TO:

PO#:

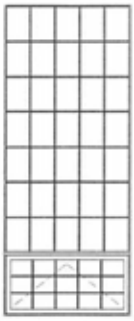
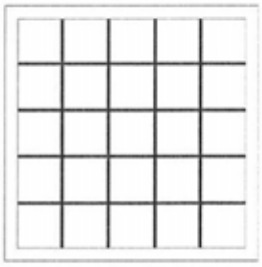
PROJECT NAME:
REFERENCE:

LINE NO.	LOCATION SIZE INFO	BOOK CODE DESCRIPTION	UNIT PRICE	QTY	EXTENDED PRICE
Line- 1	5' x 5' P/A				
Rough Opening: 59 7/8 X 59 7/8		Frame Size: 1500 x 1500 (59 1/16 x 59 1/16), ES7000, 1 Wide / 1 Wide, LH box width or Bott hgt= 750 mm, Picture, Awning, Jamb= 57 mm, (2 1/4), No Interior Options, Nailing Fin, White Ext.Colour, Dualpane, Glass type: Low-E, Argon, Grille type: Wide 5/8" IGU, Pattern: Standard rectangular, White Grille, White Hardware, Std-Folding Handle, Multi-point Lock, White Screen, PEV 2009.2.0.178/PDV 5.308 (05/08/09) WW			
 Viewed from Exterior. Scale: 1/4" = 1'			$833.00	1	$833.00
Line- 2	5' x 10' P/A				
Rough Opening: 59 7/8 X 120 1/8		Frame Size: 1500 x 3030 (59 1/16 x 119 5/16), ES7000, 1 Wide / 1 Wide, LH box width or Bott hgt= 750 mm, Picture, Awning, Jamb= 57 mm, (2 1/4), No Interior Options, Nailing Fin, White Ext.Colour, Dualpane, Glass type: Low-E, Argon, Grille type: Wide 5/8" IGU, Pattern: Standard rectangular, White Grille, White Hardware, Std-Folding Handle, Multi-point Lock, White Screen, PEV 2009.2.0.178/PDV 5.308 (05/08/09) WW			
 Viewed from Exterior. Scale: 1/8" = 1'			$1,303.00	1	$1,303.00

QQ-1.26.434 cust-SALES
Quote Date: 7/9/2009

Page 1 of 2 (Prices are subject to change.)
Drawings are for visual reference only and may not be to exact scale. All orders are subject to review by JELD-WEN

JTOZ00528 - 7/9/2009 - 15:17
Last Modified: 7/9/2009

LINE NO.	LOCATION SIZE INFO	BOOK CODE DESCRIPTION	UNIT PRICE	QTY	EXTENDED PRICE
Line- 3	5' x 12' P/A Rough Opening: 59 7/8 X 144	Frame Size: 1500 x 3635 (59 1/16 x 143 1/8), ES7000, 1 Wide / 1 Wide, LH box width or Bott hgt= 750 mm, Picture, Awning, Jamb= 57 mm, (2 1/4), No Interior Options, Nailing Fin, White Ext.Colour, Dualpane, Glass type: Low-E Tempered Ext/Int, Argon, Grille type: Wide 5/8" IGU, Pattern: Standard rectangular, White Grille, White Hardware, Std-Folding Handle, Multi-point Lock, White Screen, PEV 2009.2.0.178/PDV 5.308 (05/08/09) WW			
	 Viewed from Exterior. Scale: 1/8" = 1'		$4,212.00	1	$4,212.00
Line- 4	5' x 5' P Rough Opening: 59 7/8 X 59 7/8	7E1515-1P Frame Size: 1500 x 1500 (59 1/16 x 59 1/16), ES7000, 1 Wide, Picture, Jamb= 57 mm, (2 1/4), No Interior Options, Nailing Fin, White Ext.Colour, Dualpane, Glass type: Low-E, Argon, Grille type: Wide 5/8" IGU, Pattern: Standard rectangular, White Grille, PEV 2009.2.0.178/PDV 5.308 (05/08/09) WW			
	 Viewed from Exterior. Scale: 1/4" = 1'		$542.00	1	$542.00
Line- 5		Sentry II WLS Power Window System			
			$919.00	1	$919.00
				Total:	**$7,809.00**
				Sub Total:	**$7,809.00**
				(0 %):	**$0.00**
				Total Units:	**5**

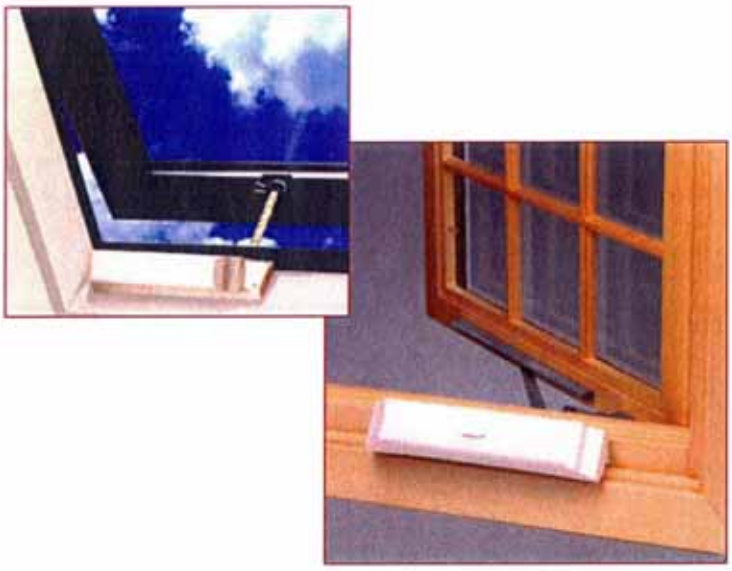
WINDOW/SKYLIGHT

SENTRY II WLS POWER WINDOW SYSTEMS

Introducing Truth's next generation of power window systems... Sentry II WLS® for windows and light skylights. Based on the powerful and reliable mechanics from our previous motorization system, we've added a new digital electronics package with built in power conversion. This new Sentry II WLS system truly takes over where Truth's Sentry 2000® left off.

The new electronics package provides many new features to enhance a homes comfort and its owner's peace of mind.

- **Retrofits** onto casement and awning windows and light skylights operated with a hand crank manufactured by Truth Hardware (see Truth Tips). The motor system drives the same input the handle is attached to.
- **Power conversion** built right into the wall mounted control package which accepts direct connection of line voltages from 100 to 240 VAC at 47 to 440 Hz. No more transformers to complicate and add expense to the installation.
- **Power Blind System compatible.** Centralized power window system control is now possible with Sentry II's ability to accept and control most 24 VDC power blind systems. The Sentry II's remote and wall switch can be used to control both window and blind motors for convenient, centralized control.
- **Power Protected Memory** eliminates the need to "reset" or retrain the motor after a power outage. Once the installation is complete the motor never needs further service or adjustments – even after prolonged power outages!
- **RF remote** compatibility built into all motor control packages as a standard feature. Simply order the optional remote to add new and exciting control capability for the homeowner.
- **Rain Sensor** - standard with all kits, automatically closes the window or skylight at the first sign of moisture. Corrosion resistant sensor decreases maintenance cleaning requirements and extends service life.
- **No special preparation** is required by the window or skylight manufacturer. The kits are suitable for new construction or retrofit applications. Please consult with your electrical contractor for a retrofit evaluation.



- **ETL Listed and CE Approved.** Meets all requirements for Class II installations.
- **Safety** - Automatic motor reversal has been engineered into the system which is intended to reverse the motor should an obstruction stop the window while closing. In addition, a screen interlock is provided which, when properly installed, electrically disconnects the motor when the screen is removed. These features are intended to help prevent personal injury which could result from reaching into the window area during its operation.
- **Motorized Sash Locks** are available for use with the WLS system for casement and awning windows. See Truth's Casement and Awning Sash Lock section for complete details.
- **Building Automation Systems** can easily be tied into the control electronics for virtually limitless ventilation possibilities.

SENTRY II WLS CAPACITY

- When used on light skylights, Truth's Sentry II WLS is load rated at 40 lbs at the chain. This equates to a total skylight hatch weight of 80 lbs.
- When used on casement windows, the Sentry II WLS is designed to work on all window systems meeting the AAMA-101 hardware load requirements. (See Truth Tips)
- When used on awning windows, the Sentry II WLS is designed to work on awning windows with a properly sized counter-balance hinge (See Truth Tips) and operator. (Consult awning operator specifications).

CONTROL OPTIONS

The Sentry II WLS kit comes with a standard wall control panel. The same control panel can also accept and control most commercially available 24 VDC mini blinds (not provided by Truth Hardware). The panel also provides feedback to the user via a status light (LED). This small LED shows when the motor is running, or if there are any problems during window or skylights operation.

The optional RF **Hand Held Remote** is available which adds even more flexibility and convenience to a homes windows or skylights.

REMOTE FEATURES INCLUDE:

- **Infinite Number** of windows & skylights can be controlled with a single remote.
- **9 Zones** or "unit codes" are available to allow units to be controlled in groups and organized to a users needs.
- **Motorized Blinds** (supplied by others) can be controlled with the same remote.
- **Control windows and skylights** from one remote – The Sentry II HS

SENTRY II WLS POWER WINDOW SYSTEMS

(for large/heavy skylights) uses the same remote as the Sentry WLS for coordinated ventilation throughout the entire home or building.

- **Built in Thermostat** allows windows and skylights to open and close together, to coordinate a comfortable interior temperature. Takes advantage of true "chimney effect" cooling to reduce energy demands.
- **Rolling Code Technology** proven in garage door openers is built into every remote to provide high security and peace of mind.

WARRANTY: The Sentry II family of products is warranted for one year against defects in materials and workmanship on all electronic and mechanical components. This warranty only covers electrical products that are used to drive manual hardware systems (operators and hinges) manufactured by Truth Hardware.

CONSUMER NOTICE:

The Sentry II WLS power system must be installed by a qualified electrician.

PRODUCT APPLICATION ASSISTANCE:

If you need assistance with product configurations to meet your needs, please visit our website at www.truth.com. Under the "Technical Support" tab you will find all of the technical information needed to properly configure and specify all elements of an automated window installation, including installation instructions, pre-wiring and proper hardware requirements. You can also contact Truth's highly trained Technical Service Staff who can assist you with the selection of the appropriate hardware. These individuals are available during normal business hours (CST) at 800-324-4487.

ORDERING INFORMATION:

Ordering of the new Sentry II systems is much easier than in the past. All hardware necessary for mounting the system on either a window or skylight is now included in the same kit.

Special Note: Motor covers are ordered separately to help keep your inventory costs down. Sentry II motor kit packaging includes additional space so cover can be added which allows the manufacturer to supply a complete kit to the jobsite.

Sentry II WLS for windows and light skylights

Order 1 each per window:
43.51.00.005 - Sentry II WLS System
12490.XX - Cover (.xx denotes finish code)
Order 1 Hand Held Remote (optional):
43.53.00.002 - Hand Held RF Remote

Finish Codes: The WLS cover is available in .02 Black, .03 Bronze, .23 Chestnut Bronze, .24 Beige, .32 White, & .78 White.

If you are applying the Sentry II to a Pella brand window you must order the following items which include special hardware and instructions.

Order 1 each per window:
43.54.00.005 - Sentry II WLS System - Pella
12490.XX - Cover (.xx denotes finish code)
Order 1 Hand Held Remote (optional):
43.53.00.002 - Hand Held RF Remote

TRUTH TIPS:

1. Truth Hardware does not recommend the use of the Sentry II WLS on any casement window system that does not meet AAMA 101 hardware load requirements. All hardware and motor system warranties are void if the window system does not meet these guidelines.

2. Awning windows must be equipped with a properly sized counter balance hinge such as Truth Hardware's 13 series or 34 series 4-bar hinges. If an awning window is specified with butt (or continuous) hinges, a skylight operator and motor system must be used. All hardware and motor system warranties are void if these guidelines are not followed. (See Tech Notes).

3. Unless otherwise specified, the Sentry II WLS power window system is designed to operate any properly sized rotary hardware and hinge system manufactured by Truth Hardware. Use of the Sentry II WLS motor system on windows or skylights with manual hardware manufactured by companies other than Truth Hardware is at your own risk. For verification, look for the Truth logo/name stamped on the hinge and operator arm, or consult with the window manufacturer. If your hardware is not manufactured by Truth Hardware, contact Truth's Technical Service Department for available options at 800-324-4487.

4. The Sentry II WLS system is rated for use in indoor applications only.

5. The Sentry II WLS power skylight system is designed to be used on skylight operators that lift to open and pull to close in the center of the skylight. Therefore, the stiles of the skylight panel must be rigid enough in the closed position to ensure proper corner pull-in for a weather tight seal and rigid enough in the open position to provide proper skylight stability when supported at a single center point. The wider the skylight is, the more significant this issue can become. For more assistance, contact Truth Hardware Technical Services.

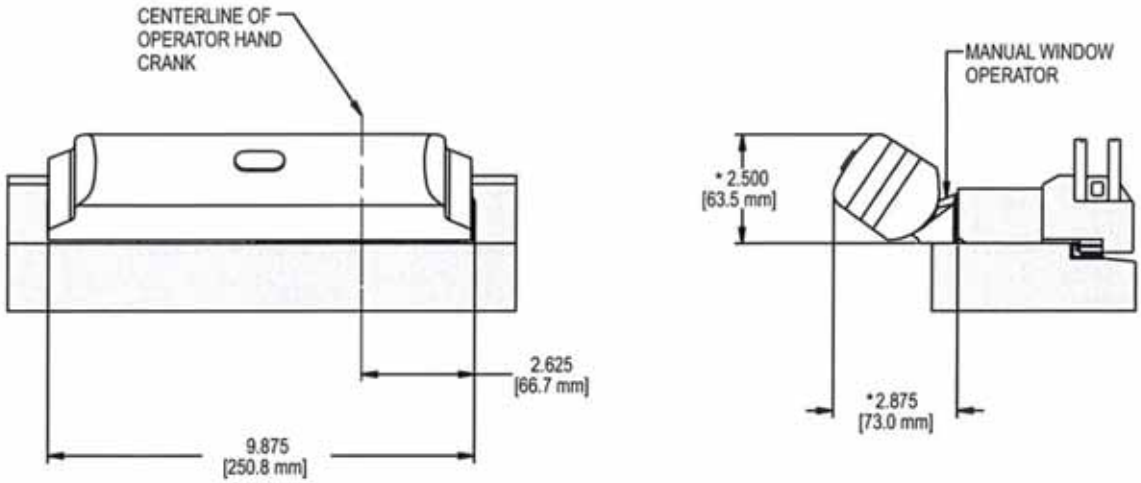
6. The Sentry II WLS requires 1 amp of 120 VAC.

INCLUDE TRUTH SPECS IN YOUR NEXT SKYLIGHT PROJECT

Motorized system for skylights (not exceeding 80 lbs), awning or casement windows. Mounting should accommodate wood, PVC or metal skylights and windows. Motorized system shall replace the handle on crank type skylight, casement or awning window operators manufactured by Truth Hardware. The motor drive to be constructed of a high pressure zinc die cast housing, containing hardened steel drive gears and a high torque 24 volt DC motor. Interchangeable drive adapter allows the system to be compatible with all Truth operators and many other window hardware systems not manufactured by Truth (contact Truth Technical Services for a list of compatible hardware). Mounting hardware to be provided to accommodate a wide range of window profile shapes and materials. Unit to be available with a decorative plastic cover which allows convenient access to mechanical components and easy installation. The control system is to be supplied with standard line voltages from 100 to 240 VAC at 47 to 440 Hz. (no transformer required). The wall mounted motor control is to come complete with its own receptacle box and cover plate. Motor system kit shall include: motor drive, decorative cover, wall control, and mounting hardware. This motor system shall be "Sentry II WLS" series as manufactured by Truth Hardware, Owatonna, MN.

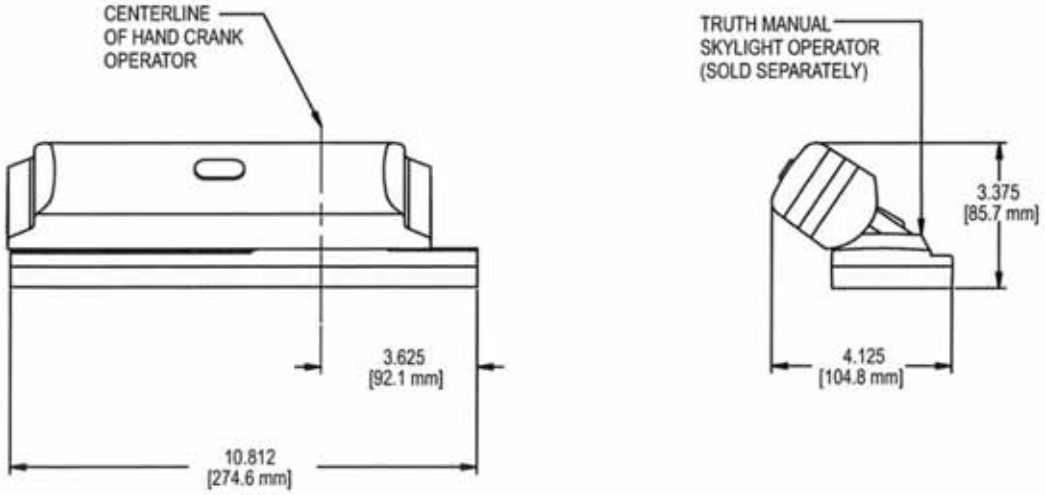
SENTRY II WLS POWER WINDOW SYSTEMS

FIG. 1 WLS MOTOR SYSTEM APPLIED TO AWNING/CASEMENT WINDOW



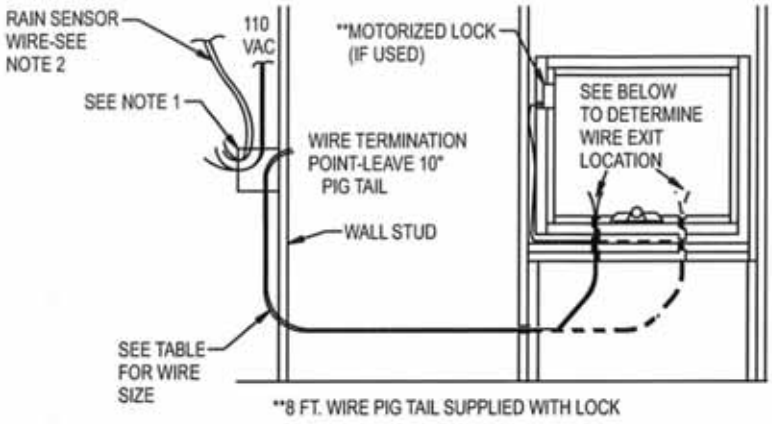
* THESE DIMENSIONS WILL VARY SLIGHTLY DEPENDING ON MANUAL OPERATOR USED

FIG. 2 WLS MOTOR SYSTEM APPLIED TO SKYLIGHT WINDOW



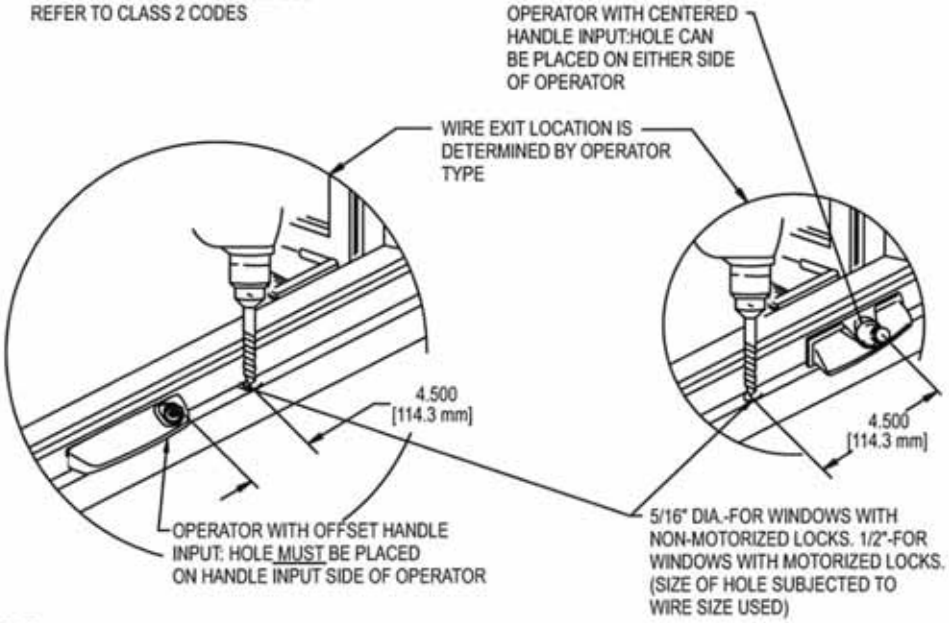
SENTRY II WLS POWER WINDOW SYSTEMS

FIG. 3 SENTRY II PRE-WIRING FOR CASEMENT/AWNING WINDOWS



WIRE SIZE (CLASS 2)	TOTAL DISTANCE FROM CONTROL PANEL TO MOTOR	NUMBER OF CONDUCTORS		
		MOTOR ONLY	MOTOR + 1 LOCK	MOTOR + 2 LOCKS
18 AWG	50 ft (15m)MAX	2	4	6
14 AWG	100 ft (30m)MAX			
12 AWG	150 ft (60m)MAX			

SOLID CORE WIRE RECOMMENDED
REFER TO CLASS 2 CODES



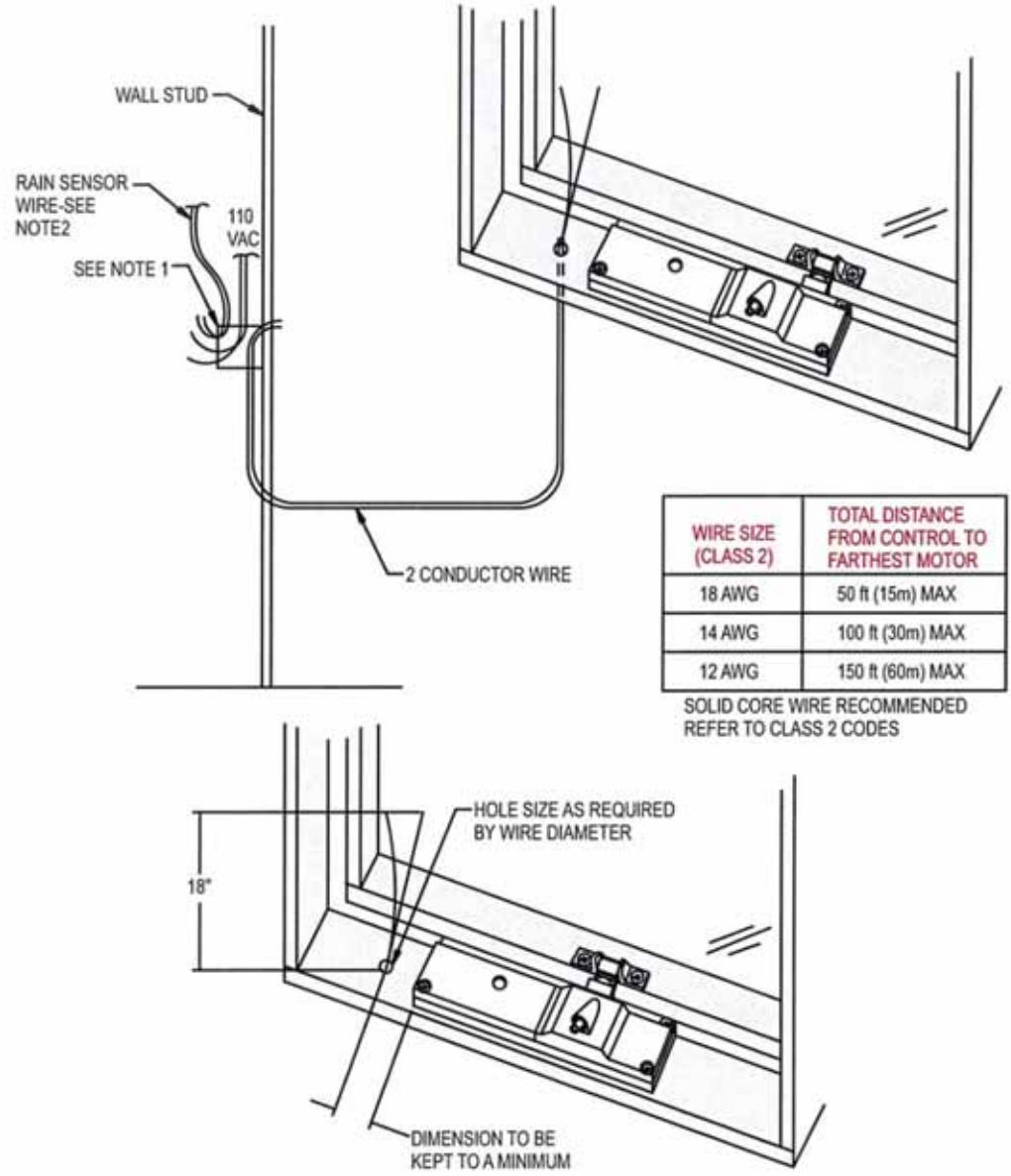
NOTE:

1. EACH POWERED WINDOW REQUIRES A CONTROL PANEL. CONTROL PANEL FITS A FINISHED WALL OPENING OF 3 7/8" WIDE BY 4 1/8" HIGH. (RECEPTICAL BOX IS SUPPLIED AS AN INTERGRAL PART OF THE CONTROL PANEL.) CONTROL PANEL CAN BE LOCATED IN A REMOTE LOCATION IF THE CONTROL PANEL IS NOT INTENDED TO BE THE PRIMARY MEANS OF CONTROL. (EXAMPLE: RF REMOTE CONTROL OF BUILDING AUTOMATION CONTROL SYSTEM)

2. RAIN SENSOR WIRE MUST BE 22 GAUGE TWISTED,SHIELDED PAIR

SENTRY II WLS POWER WINDOW SYSTEMS

FIG. 4 SENTRY II WLS PRE-WIRING FOR SKYLIGHTS



WIRE SIZE (CLASS 2)	TOTAL DISTANCE FROM CONTROL TO FARTHEST MOTOR
18 AWG	50 ft (15m) MAX
14 AWG	100 ft (30m) MAX
12 AWG	150 ft (60m) MAX

SOLID CORE WIRE RECOMMENDED
REFER TO CLASS 2 CODES

NOTE:

1. EACH POWERED SKYLIGHT REQUIRES A CONTROL PANEL. CONTROL PANEL FITS A FINISHED WALL OPENING OF 3 7/8" WIDE BY 4 1/8" HIGH. (RECEPTACLE BOX IS SUPPLIED AS AN INTEGRAL PART OF THE CONTROL PANEL) CONTROL PANEL CAN BE LOCATED IN A REMOTE LOCATION IF THE CONTROL PANEL IS NOT INTENDED TO BE THE PRIMARY MEANS OF CONTROL. (EXAMPLE: RF REMOTE CONTROL OR BUILDING AUTOMATION CONTROL SYSTEM)

2. RAIN SENSOR WIRE MUST BE 22 GAUGE TWISTED, SHIELDED PAIR

7.2 Option 2(b) – Replace Existing Windows with Kalwall thermal windows:

(Supply & Install)

Thermal Systems KWC Ltd.
2780 – 24 Avenue N.E.
Calgary, Alberta T1Y 6V7
Tel. (403) 250-5507
Fax (403) 250-6891

July 13, 2009 Our File: 7080810

SENT VIA FAX: (250) 364-1994

Redwood Engineering Ltd.
3120 Highway Dr.
Trail, BC VIR 2T3

ATTENTION: Mike Piva

RE: Fortis BC Powerhouse Windows
Bonnington, BC

We are pleased to submit our **budget** quotation for work at the above project as follows:

1. KALWALL TRANSLUCENT FIBERGLASS SANDWICH PANEL SYSTEM:

   Supply materials, labour and equipment to install 2 ¾" Kalwall translucent panel systems to forty rough openings complete with wall mounted actuator for operable awnings. Systems complete with incorporated fasteners, sealant and sill flashings.

   THE ABOVE FOR THE BUDGET SUM OF..... $245,900.00

   ALTERNATES:

   1.1 Provide manually operated operators for the Kalwall operable windows in lieu of wall mounted actuators.

   DEDUCT THE SUM OF (TO BASE PRICE ABOVE)..... $5,000.00

PLEASE NOTE:

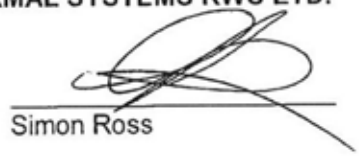
A. OUR QUOTATION IS BASED ON:

1. Goods and Services tax extra.
2. Provincial Sales Tax included.
3. Information provided June 12, 2009 by Redwood Engineering Ltd..
4. A guarantee which will extend to 1 year from our 'Substantial Performance' date.
5. Thermal Systems and Kalwall standard details.
6. Supports provided by others to suit Kalwall requirements.
7. Walls designed for 35 p.s.f. wind load.
8. Kalwall is a product which has extended deliveries, thus it should be ordered in the early stages of this project to prevent future jobsite delays.
9. All exposed aluminum having Kalwall's corrosion resistant finish colour selected from Kalwall standard colours.

10. Translucent wall panels having .070" super-weathering Crystal exterior faces, .045" Type 25 White interior faces, 12" x 24" Shoji grid pattern and a 0.23 "U" factor by NFRC.
11. Electrical work to be provided by others.
12. Project out windows to be 2'-6" high and 3'-0" high, glazed with 1" Kalwall panel.

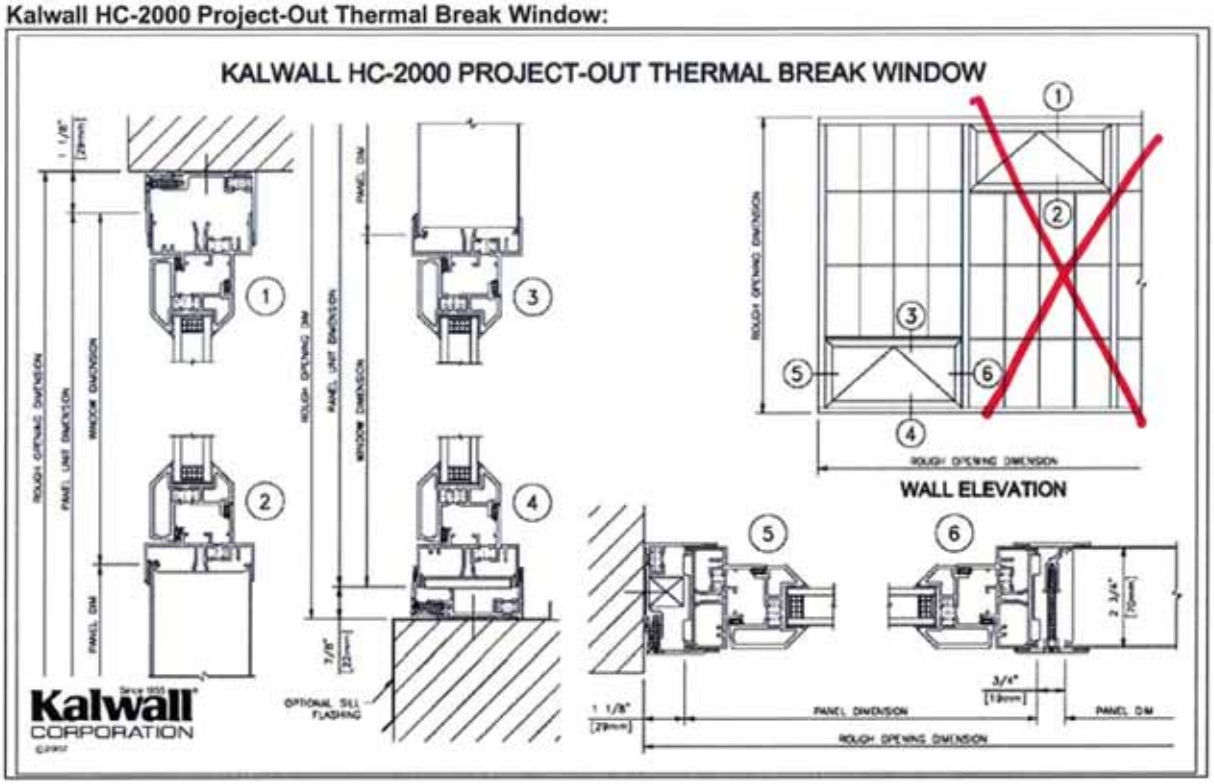
We thank you for the opportunity to quote on this work, and trust this proposal will meet with your approval.

Yours truly,
THERMAL SYSTEMS KWC LTD.

Per: 
Simon Ross

SMR/djl

Kalwall HC-2000 Project-Out Thermal Break Window:



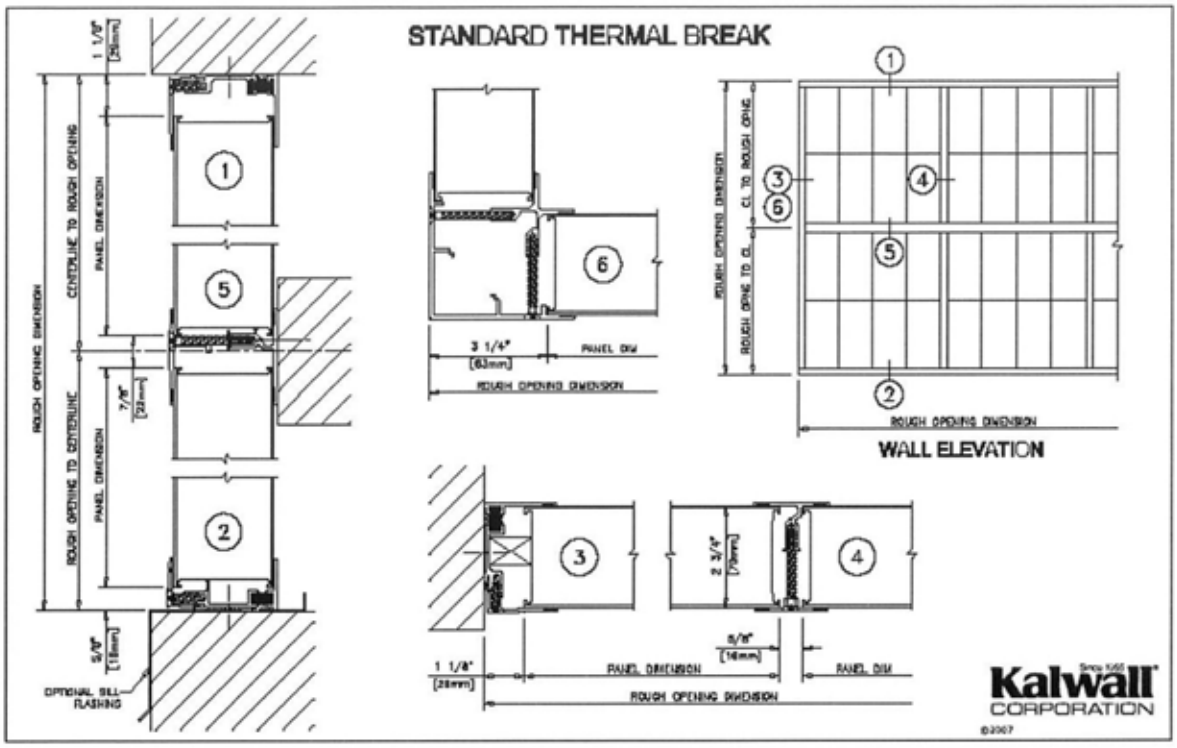
CAUTION: Not all CAD details are appropiate for use in all applications. In order to ensure accuracy, expedite your project and save you time and money, please provide your email address here so that we may assist you, even at a preliminary stage, in your design.

To view and download construction-ready detail drawings, mouse over detail and click on the detail number or click on the detail name. Download this entire system drawing as a .DWG or .PDF file.

- 1 HC Project-Out Head
- 2 HC Project-Out Mid-Panel Bottom
- 3 HC Project-OUT Mid-Panel Top
- 4 HC Project-Out Sill
- 5 HC Project-Out Jamb
- 6 HC Project-Out Batten

◂Back

Kalwall Standard Thermal Break Wall System:



CAUTION: Not all CAD details are appropiate for use in all applications. In order to ensure accuracy, expedite your project and save you time and money, please provide your email address here so that we may assist you, even at a preliminary stage, in your design.

To view and download construction-ready detail drawings, mouse over detail and click on the detail number or click on the detail name. Download this entire system drawing as a .DWG or .PDF file.

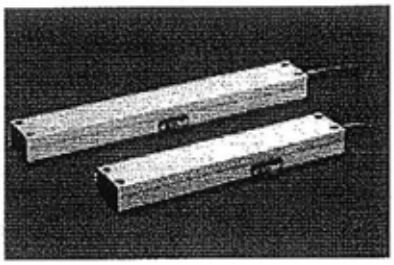
- 1 Thermal Break Head
- 2 Thermal Break Sill
- 3 Thermal Break Jamb
- 4 Wall Batten
- 5 Multi-Story Batten
- 6 Outside Corner Batten

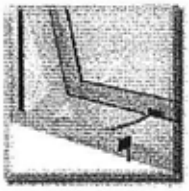
Back

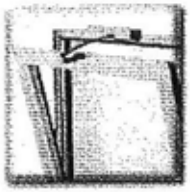
MINGARDI®
SPECIFICATION SHEET

MICRO S 1MS...

200 N





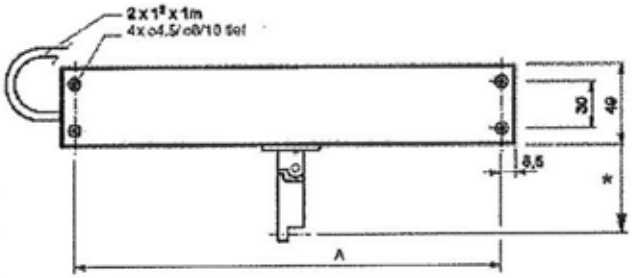


DESCRIPTION

MINGARDI linear electric actuator with movement by a flat link chain contained inside the shell.
Operating voltage: 230V~ 50 Hz or 24V DC.
Conforms to directives 73/23 LVD - 89/336 EMC as modified by 93/68 EEC (for operation at 24V DC, it is compliant with directive 89/336 EMC as modified by 93/68 EEC).
Prepared in advance for limit switch system.
Parallel connection is available.
Colours available: anodised silver, electrocolour, RAL colours .

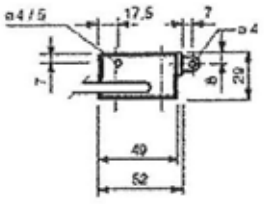
SCALE DRAWINGS MICRO S 230V~

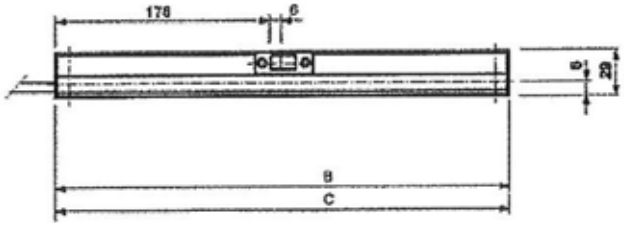
1 MSM200140A00
1 MSM200140N00
1 MSM250140A00
1 MSM250140A00



★ I = CORSA
GB = STROKE
F = COURSE
D = HUB
E = CARRERA

★	A	B	C
200	324	338	341
250	349	363	366





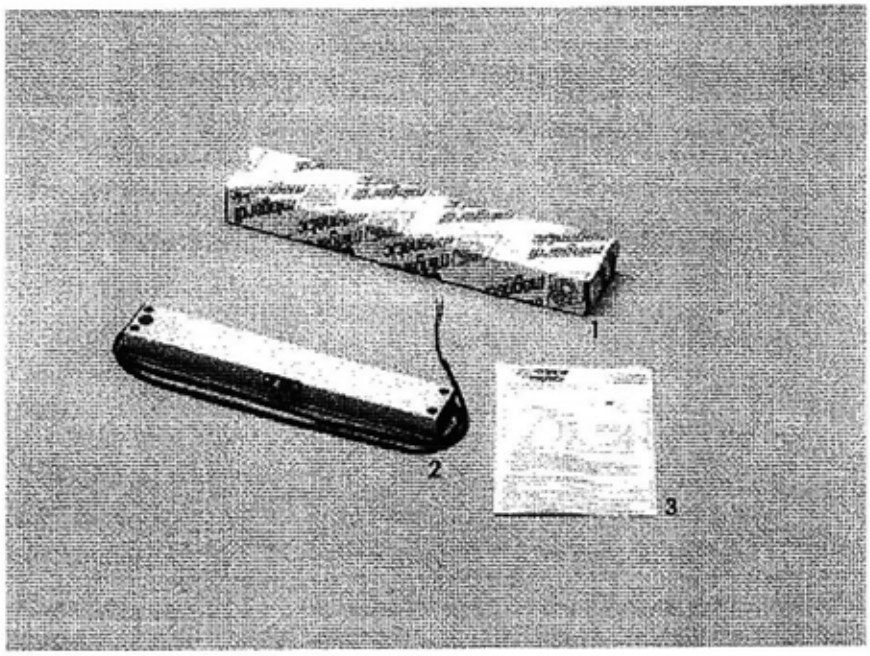
200 N **MICRO S** 1MS... SPECIFICATION SHEET

TECHNICAL FEATURES OF THE MICRO S ACTUATOR - VERSION 230V~			VALUE
OPERATING VOLTAGE			230 V~ +/- 6%
FREQUENCY			50Hz
STROKE	WEIGHT	DIMENSIONS OF INDIVIDUAL PACKAGE (mm)	DIMENSIONS OF INDIVIDUAL PACKAGE (mm)
200 mm	0,80 Kg	411 X 57 X 78	427 x 200 x 187
250 mm	0,84 Kg	411 X 57 X 78	427 x 200 x 187
THRUST FORCE			200 N
Actuator power in-take at maximum thrust load			30 W
Current at maximum thrust load			0,30 A
Actuator consumption without load			16 W
Current without load			0,2 A
Travel speed without maximum thrust load			17mm/sec
TENSILE FORCE			200 N
Actuator consumption at maximum tensile load			30 W
Current at maximum tensile load			0,30 A
Travel speed at maximum tensile load			10 mm/sec
Travel speed without maximum tensile load			17 mm/sec
THERMAL OVERLOAD PROTECTION WITH INTERNAL CUT-OUT SWITCH			/
OPERATING TIME			4 min.
LIMIT SWITCH (type)			Hall Sensor/Absorpt.
PARALLEL CONNECTION			Yes
INSULATION CLASS (of the motor)			H
PROTECTION DEGREE			IP 20
COLOUR (also see SPECIAL EQUIPMENT key)			Anodised silver and black
PRODUCT LIFE			NUMBER OF MOVEMENTS
Opening strokes			10000
Closing strokes			10000

N.B. The values set out on the table were recorded in a climatic test chamber at operating temperatures of between -10 to +40 °C with 60% relative humidity.

200 N **MICRO S** 1MS... SPECIFICATION SHEET

PACKAGE CONTENTS - MICRO S 230V~

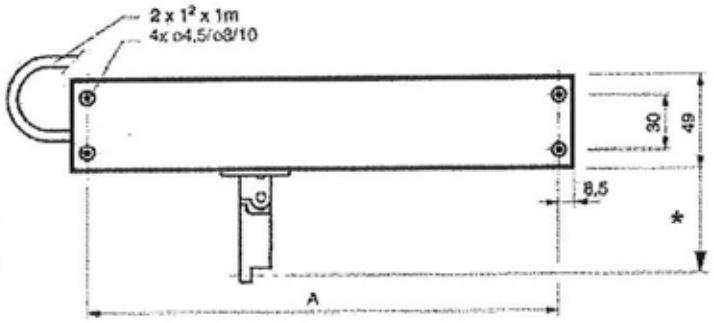


1 Package - 2 Actuator - 3 User and Installation Manual

200 N **MICRO S** 1MS... SPECIFICATION SHEET

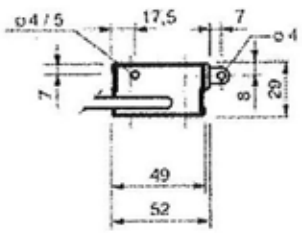
SCALE DRAWINGS - MICRO S 24V d.c.

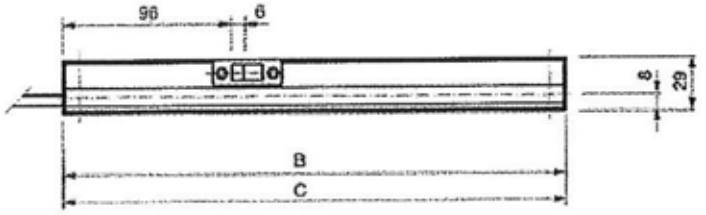
1MSM200920A00
1MSM200920N00
1MSM250920A00
1MSM250920N00



* I = CORSA
GB = STROKE
F = COURSE
D = HUB
E = CARRERA

*	A	B	C
200	224	258,4	261,4
250	269	283,4	286,4





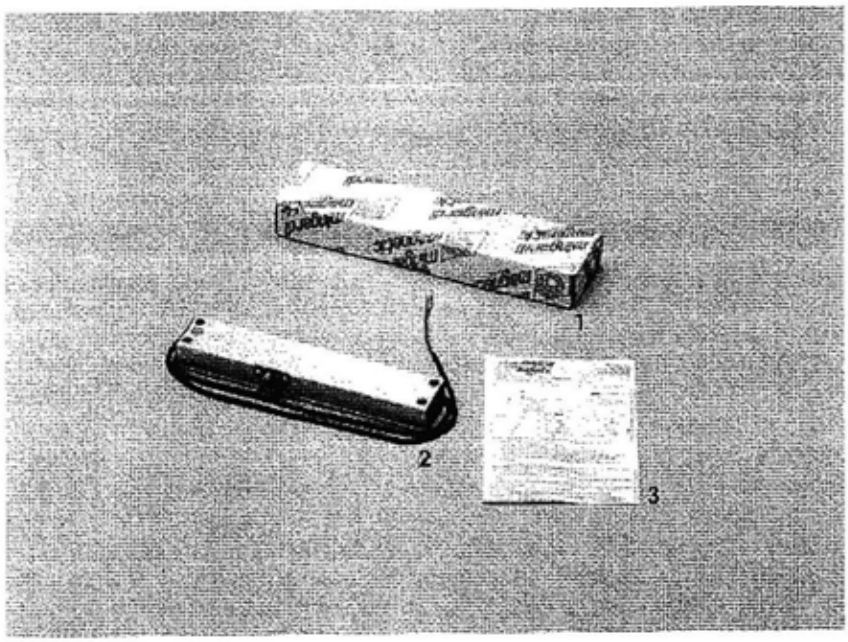
200 N **MICRO S** 1MS... SPECIFICATION SHEET

TECHNICAL FEATURES OF THE MICRO S ACTUATOR - VERSION 24V d.c.			VALUE
OPERATING VOLTAGE			24 V= +/- 6%
FREQUENCY			/
STROKE	WEIGHT	DIMENSIONS OF INDIVIDUAL PACKAGE (mm)	DIMENSIONS OF INDIVIDUAL PACKAGE (mm)
200 mm	0,63 Kg	411 X 57 X 78	427 x 200 x 187
250 mm	0,67 Kg	411 X 57 X 78	427 x 200 x 187
THRUST FORCE			200 N
Actuator power in-take at maximum thrust load			20 W
Current at maximum thrust load			0,80 A
Actuator consumption without load			6 W
Current without load			0,40 A
Travel speed without maximum thrust load			14 mm/sec
TENSILE FORCE			200 N
Actuator consumption at maximum tensile load			20 W
Current at maximum tensile load			0,80 A
Travel speed at maximum tensile load			10 mm/sec
Travel speed without maximum tensile load			14 mm/sec
THERMAL OVERLOAD PROTECTION WITH INTERNAL CUT-OUT SWITCH			/
OPERATING TIME			5 min.
LIMIT SWITCH (type)			Reed / Absorption
PARALLEL CONNECTION			Yes
INSULATION CLASS (of the motor)			H
PROTECTION DEGREE			IP 20
COLOUR (also see SPECIAL EQUIPMENT key)			Anodised silver and black
PRODUCT LIFE			NUMBER OF MOVEMENTS
Opening strokes			10000
Closing strokes			10000

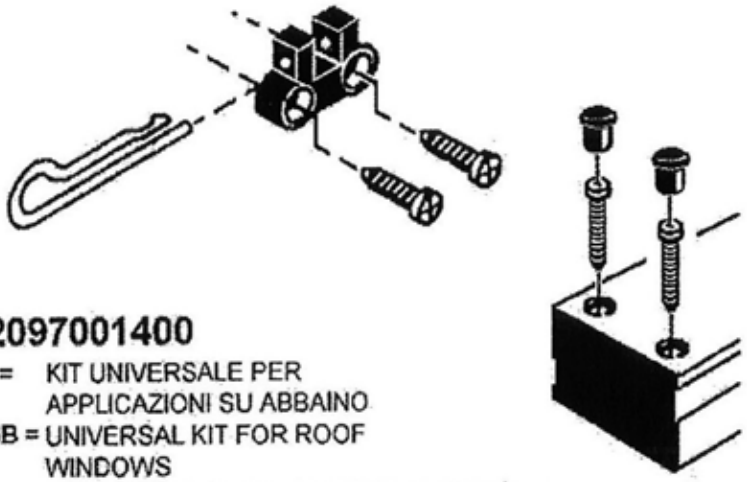
N.B. The values set out on the table were recorded in a climatic test chamber at operating temperatures of between -10 to +40 °C with 60% relative humidity.

200 N **MICRO S** 1MS... SPECIFICATION SHEET

PACKAGE CONTENTS - MICRO S 24V d.c.



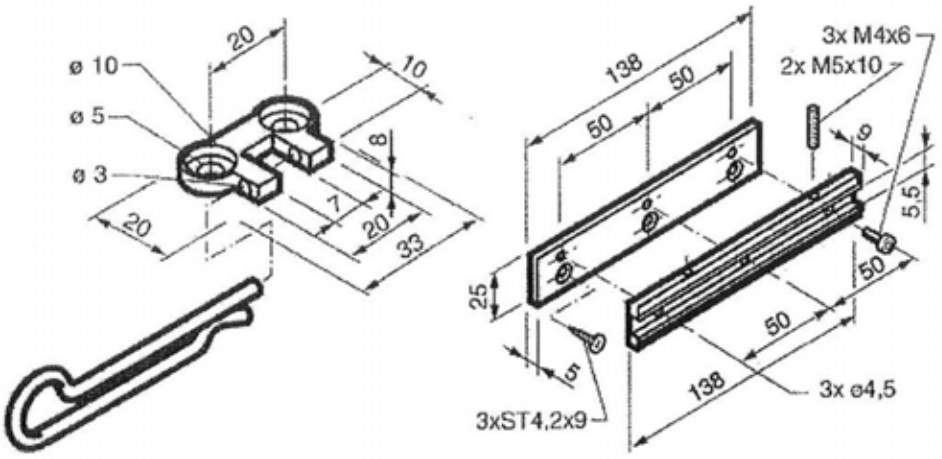
1 Package - 2 Actuator - 3 User and Installation Manual



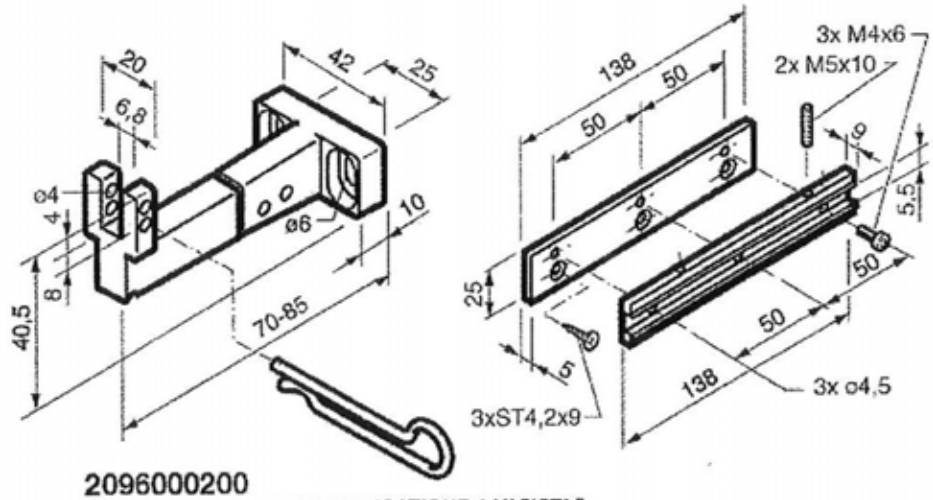
2097001400

I = KIT UNIVERSALE PER APPLICAZIONI SU ABBAINO
GB = UNIVERSAL KIT FOR ROOF WINDOWS
F = KIT UNIVERSEL POUR APPLICATIONS SUR FENETRE MANSARDEE
D = UNIVERSAL BAUSATZ FÜR DACHFENSTERANWENDUNGEN
E = KIT UNIVERSAL PARA APLICACIONES EN BUHARDA

FIXING ACCESSORIES AVAILABLE UPON REQUEST - MICRO S
(FOR BOTH VERSIONS)



2096000100
I = KIT UNIVERSALE PER APPLICAZIONE A SPORGERE
GB = UNIVERSAL KIT FOR FITTING TOP HUNG WINDOWS
F = KIT UNIVERSEL POUR APPLICATIONS SAILLANTES
D = UNIVERSALBAUSATZ FÜR KLAPPFENSTERANWENDUNGEN
E = KIT UNIVERSAL PARA APLICACIONES PROYECTANTES



2096000200
I = KIT UNIVERSALE PER APPLICAZIONE A VASISTAS
GB = UNIVERSAL KIT FOR FITTING BOTTOM HINGED WINDOWS
F = GROUPE ACCESSOIRES POUR VASISTAS
D = UNIVERSAL-EINBAUSATZ FÜR DIE ANWENDUNG AUF KIPPFENSTERN
E = GRUPO UNIÓN DE VENTANA DE FUELLE ALTA

MINGARDI®
MINGARDI SRL - Via J.F.Kennedy, 11 - 40069 Zola Predosa (Bo) Italy - Tel. 051.6169111 - Fax 051.6169199

7.3 Scaffolding:

CHINOOK SCAFFOLD SYSTEMS LTD

Head Office
9189 National Place
Prince George, BC V2N 5T1
(888)562-0600 Fax (250)563-1655

"Safety Built on Service"

Alberta
(780)421-9354 Fax (780)466-9377
Kitimat
(250)639-0361 Fax (250)632-6102
Nanaimo
(250)741-1101 Fax (250)741-1147
Trail
(250)693-0006 Fax (250)693-8860

BUDGET

Budget #: 10807
Date: Jul 10, 2009
Page: 1

Budget For:

Redwood Engineering Ltd.
3120 Highway Drive
Trail, British Columbia V1R 2T3

Attn: Mike Piva

Budget
Re: Window Replacement Fortis Dams
Start Date: Budget valid until December 10, 2010.

The following is a Chinook Scaffold System's budget to supply, erect and dismantle scaffold for the above mentioned project.

-
-

Scaffolds are needed to remove and replace window units at four Fortis Dams along the Kootenay River. Chinook will build four scaffolds at one time, each scaffold will be 7' x 7' x 45' high. Each scaffold will have 5 deck levels that may have to be built with the top section left off so the crane can be used to lower the bottom window units. They wll be anchored into the power plant walls with 1/2" hilti drop anchors and ready rod. This price is based on labour to erect and dismantle four scaffolds at a time. The rental is based on a 28 day rental period, regardless of how many times the scaffolds are built and dismantled.

-
-
-
-
-
-

Material Charges --- per 28 days	1,932.40
Labour	9,662.40
Insurance	158.40
Safety	289.87
Cartage	420.00
Travel	600.00
Consumables	200.00
Subtotal:	13,263.07

Total Budget - does not include applicable taxes 13,263.07

Safety Plan
1) Prior to any work start, Chinook will do a complete safety review.
2) All our work will be done in compliance with Chinook policy, site policy, WCB and manufacturer's specifications.
3) The scaffold will be tagged at all times.
4) A site-specific hazards assessment will be in place.
5) A fall protection plan will be in place.

Thank you for the opportunity of providing you with our budget. If you have any questions or require further information please contact us.

Yours Truly
Chinook Scaffold Systems Ltd

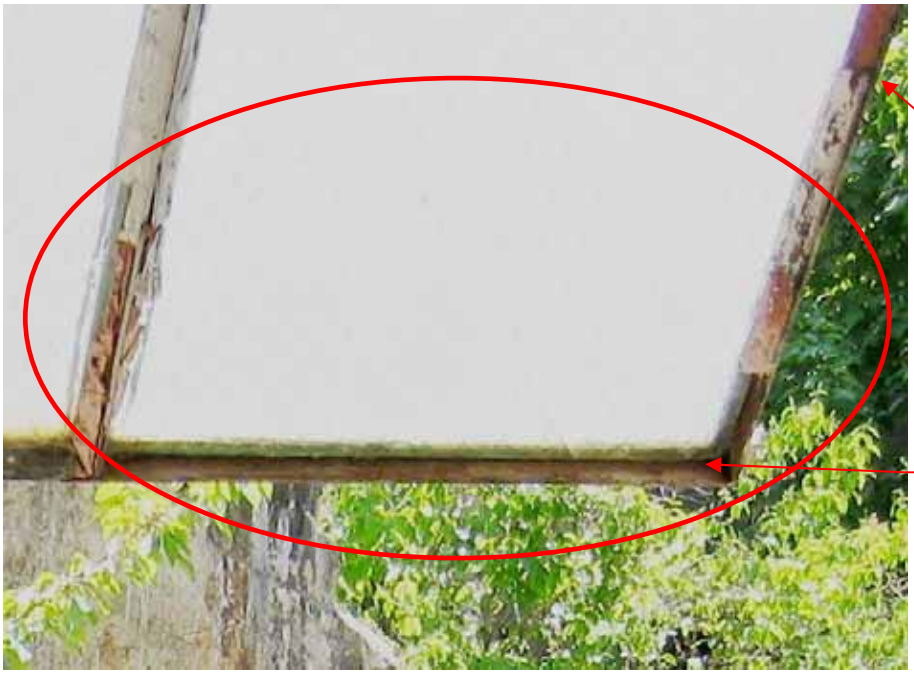
Curtis Lemieux : bjs

8.0 Pictures

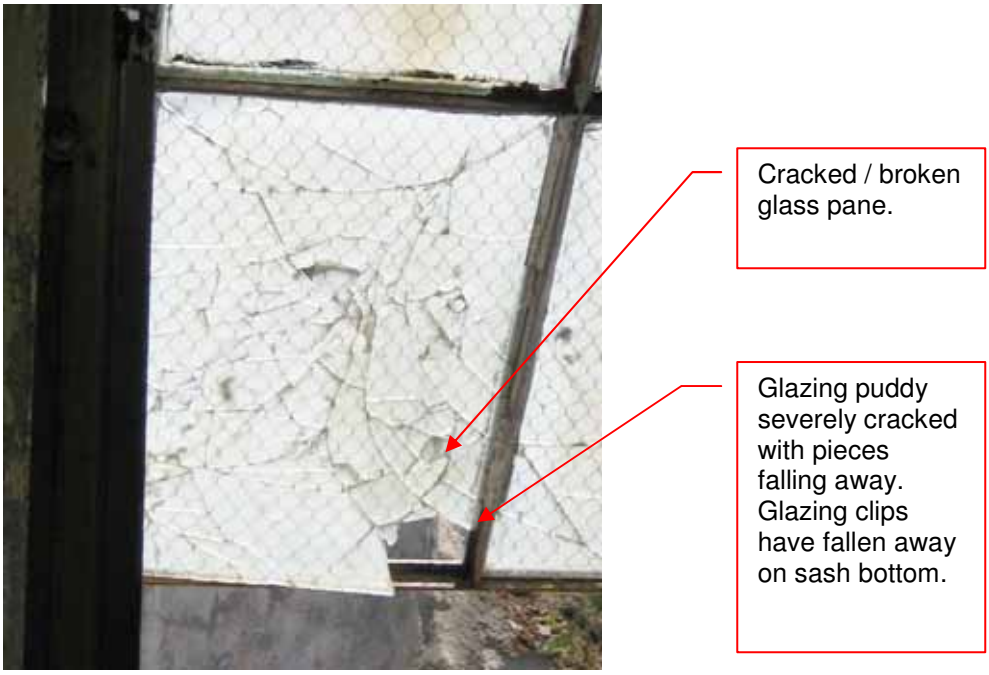
Picture 1 (P1 - Window 'R2')

Picture 2 (P1 - Window 'R2')

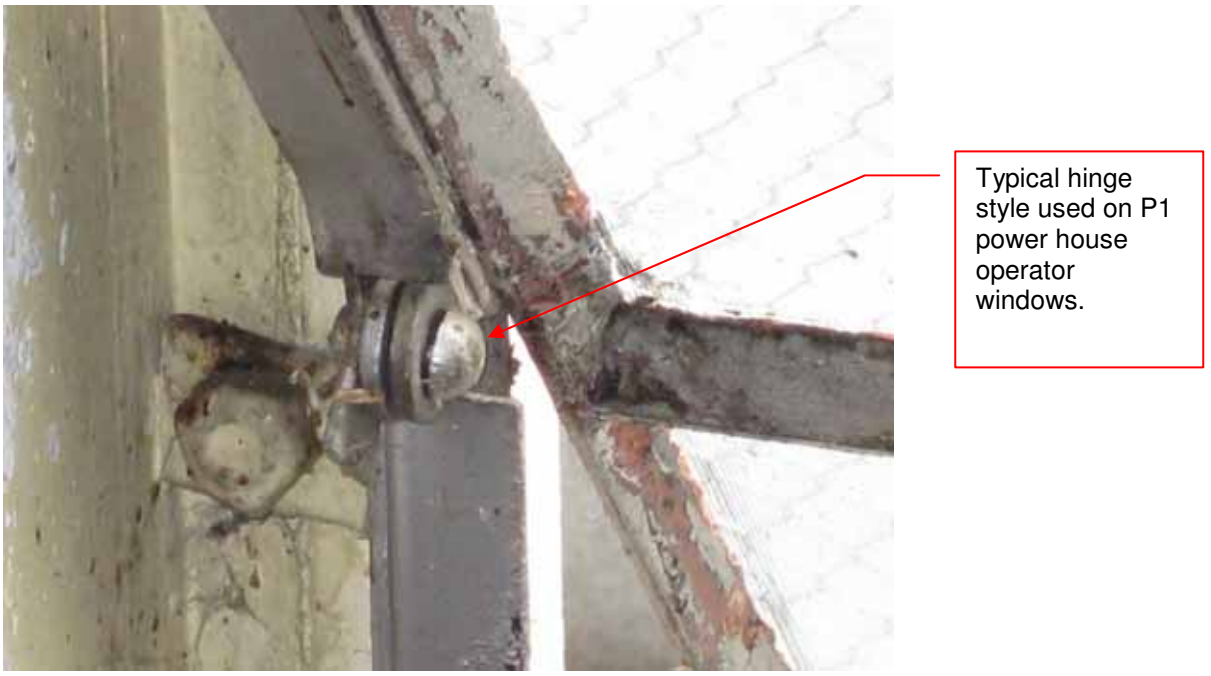
Picture 3 (P1 - Window 'R2')



Picture 4 (P1 - Window 'R2')



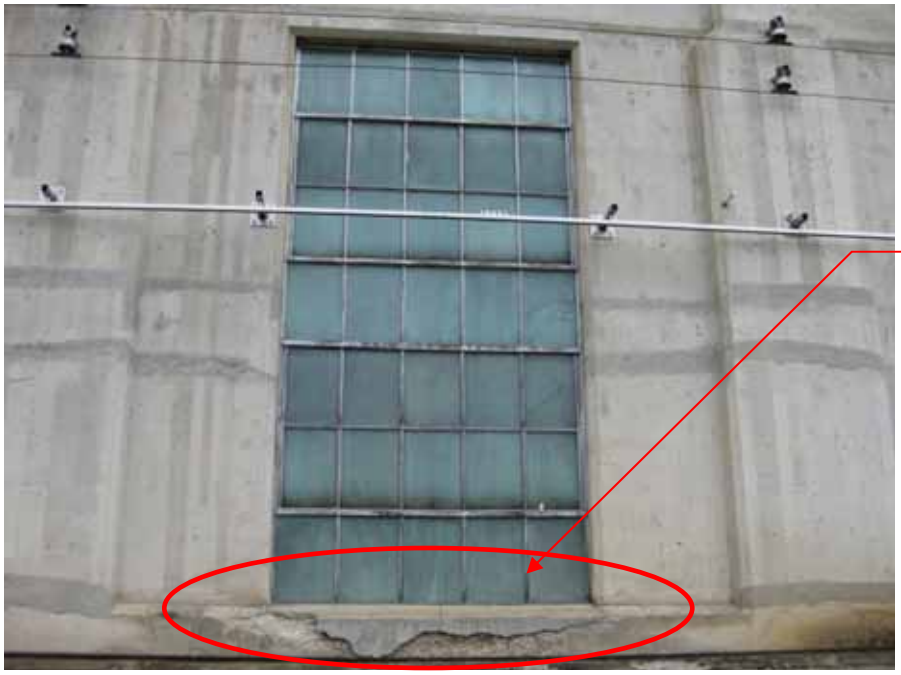
Picture 5 (P1 - Window 'N2')



Picture 6 (P1 – Window 'P2')

Picture 7 (P1 – Window 'O2')

Picture 8 (P1 – Window 'N2')



Picture 9 (P1 – Window 'L1')

Picture 10 (P1 – Window 'K1')

Picture 11 (P1 – Window 'M1')

Picture 12 (P1 – Window 'H1')

Picture 13 (P2 – Window 'R3')

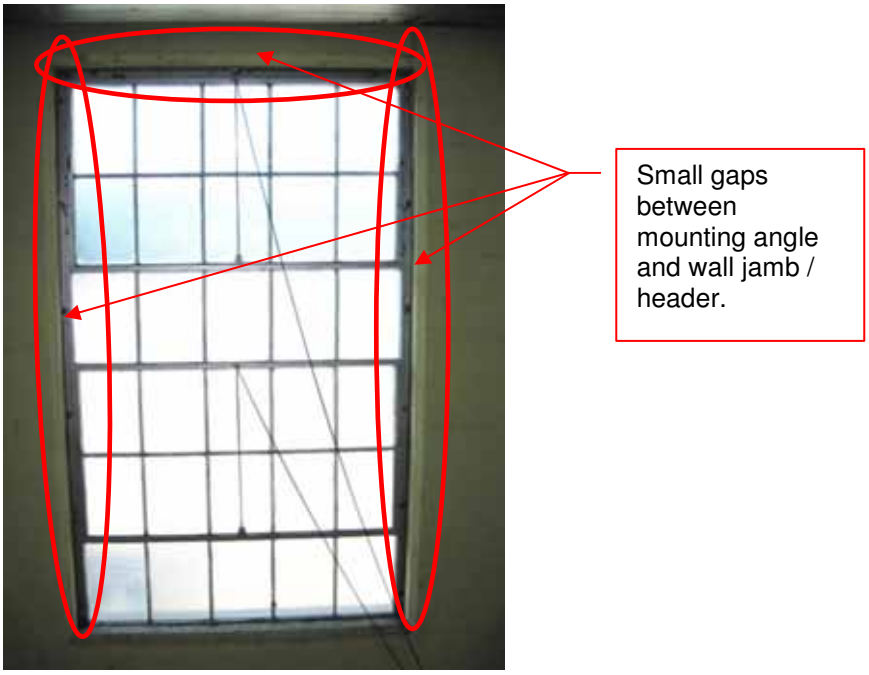
Picture 14 (P2 – Window 'I1')

Picture 15 (P2 – Window 'K3')

Picture 16 (P2 – Window 'J3')

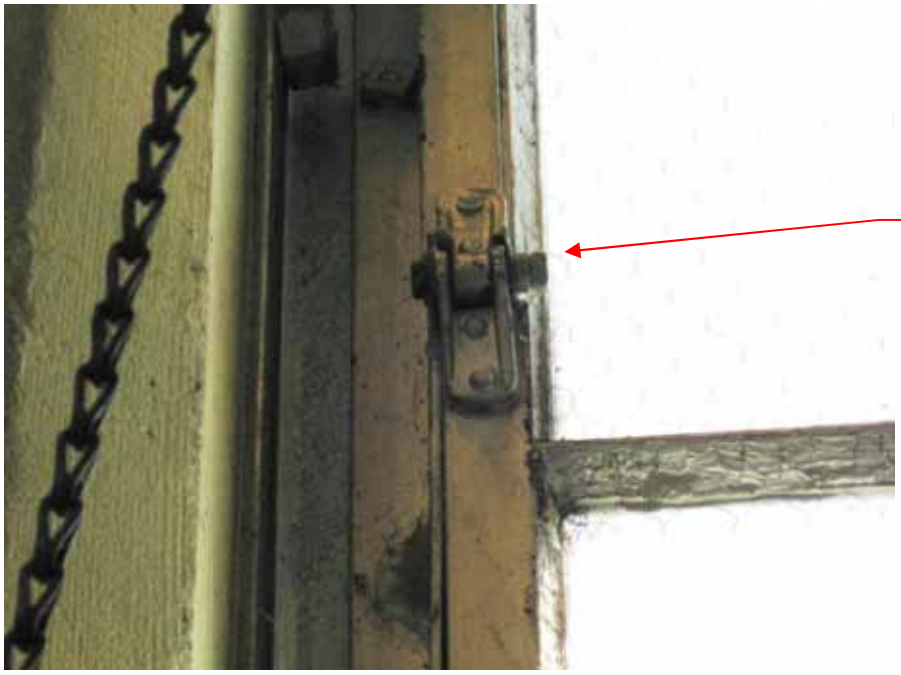
Picture 17 (P2 – Window 'D1)

Picture 18 (P2 – Window 'F1')

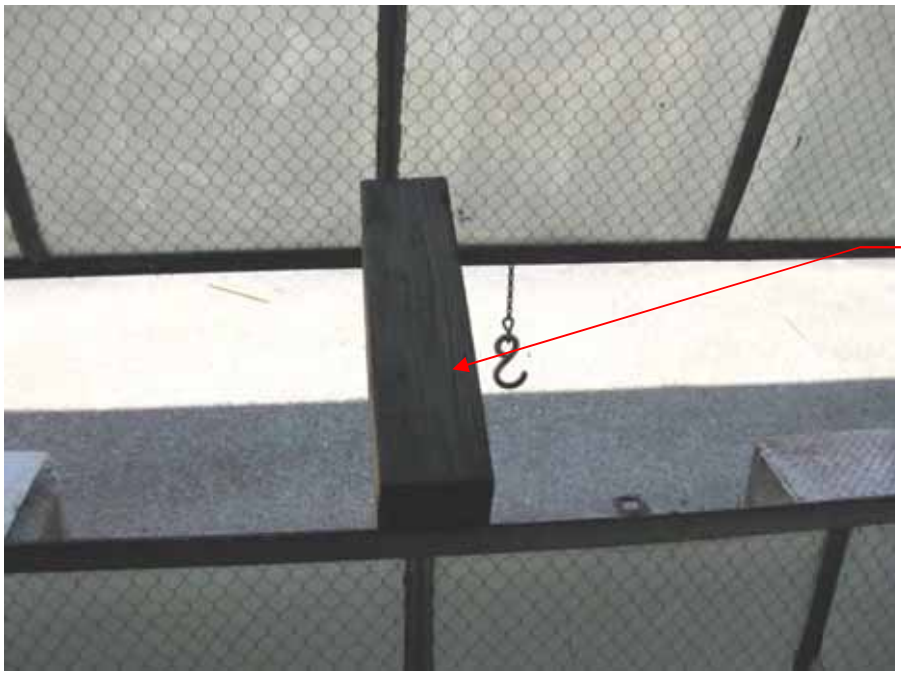


Picture 19 (P3 – Window 'G3')

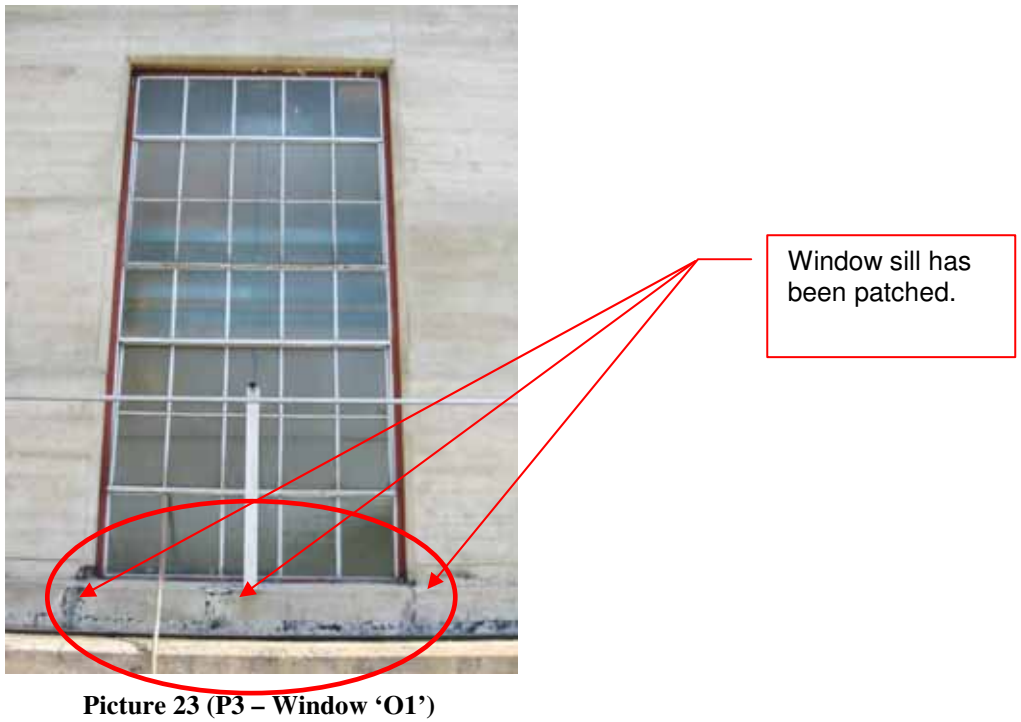
Picture 20 (P3 – Window 'P3')



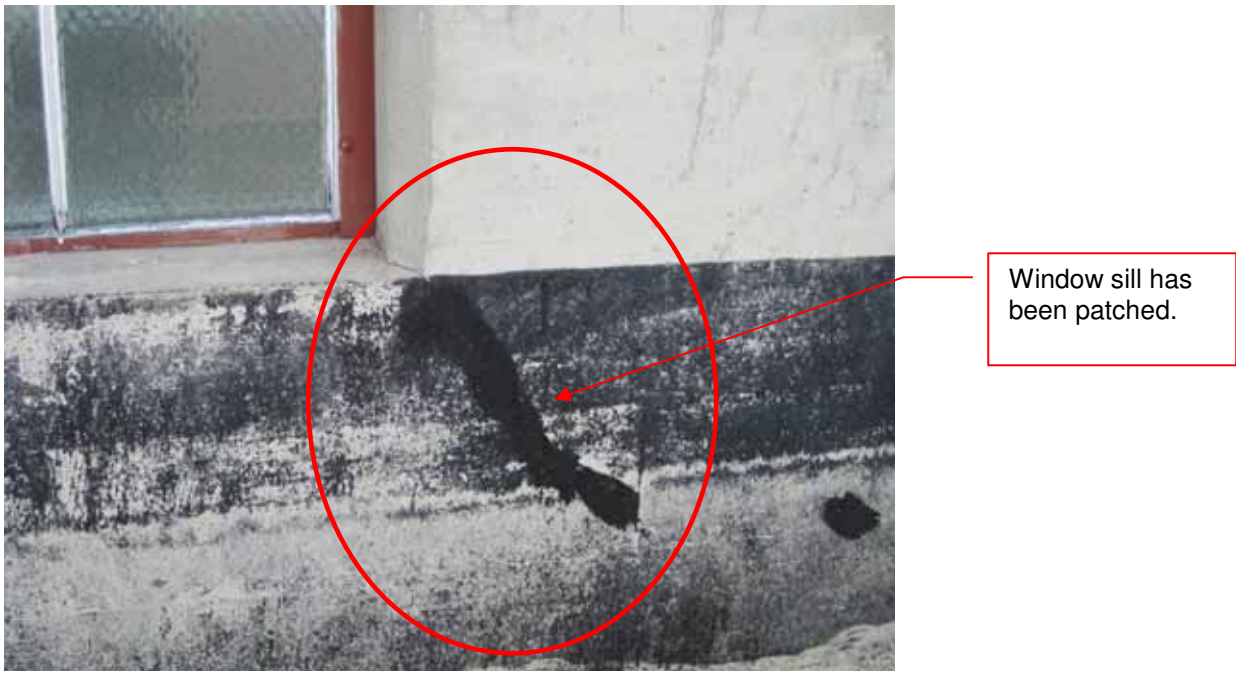
Picture 21 (P3 – Window 'O1')



Picture 22 (P3 – Window 'Y3')



Picture 23 (P3 – Window 'O1')



Picture 24 (P3 – Window 'W3')

Picture 25 (P4 – Window 'N3')

Picture 26 (P4 – Window 'FF2')

Picture 27 (P4 – Window 'V3')

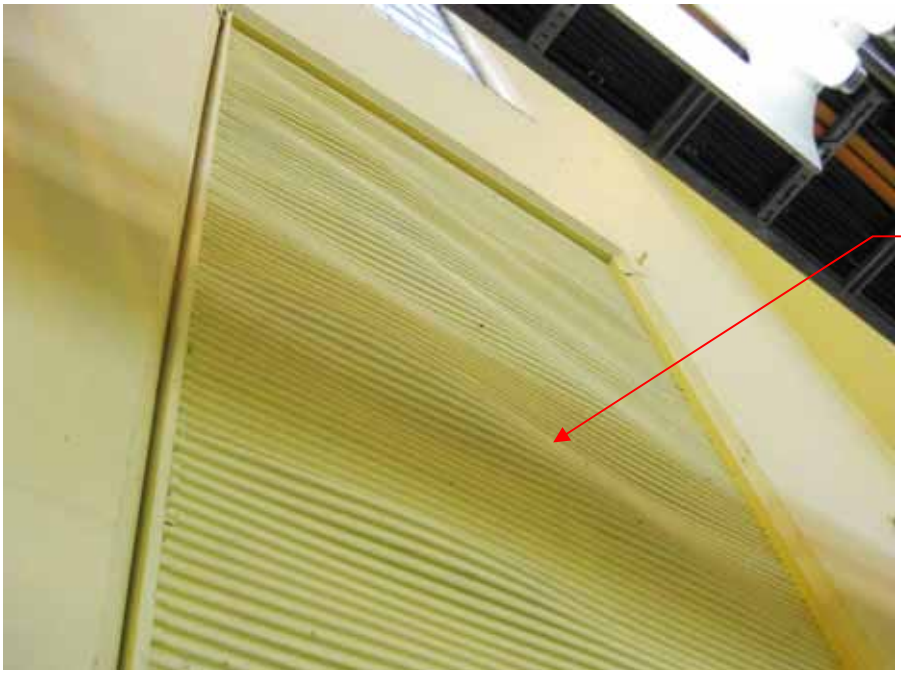
Picture 28 (P4 – Window 'S1')

Cable tray running through window and window sealed off on exterior with sheetmetal.

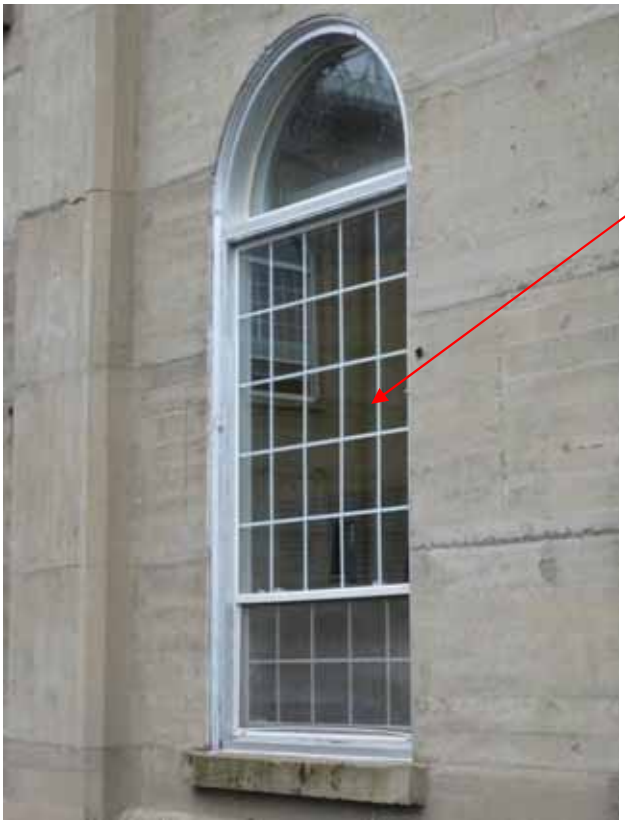
Picture 29 (P4 – Window 'C2')

Window partially removed to allow warm air from powerhouse to enter into warm room located on exterior roof.

Picture 30 (P4 – Window 'AA3')



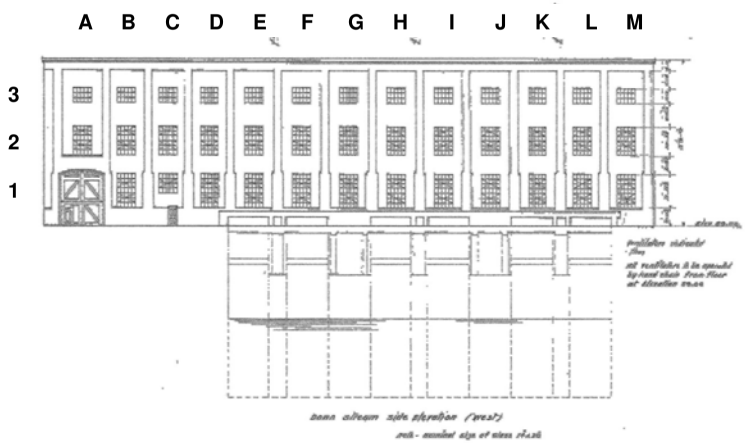
Picture 31 (P4 – Window 'F1')

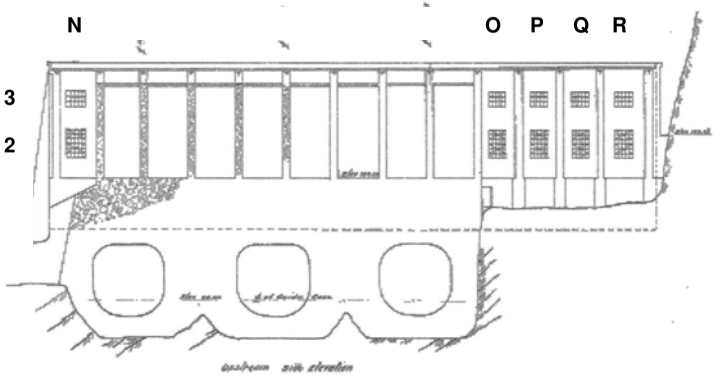


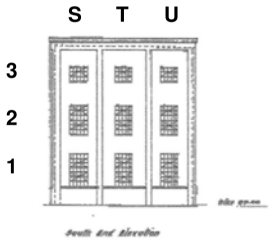
Picture 32 (P2 - Original 1907 building)

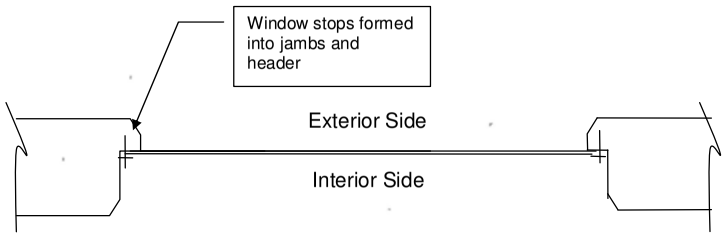
9.0 Drawings

P1 - Lower Bonnington Powerhouse:

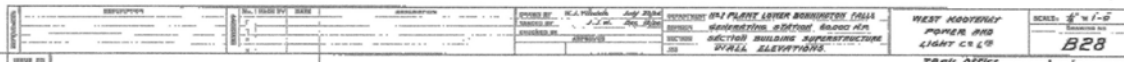




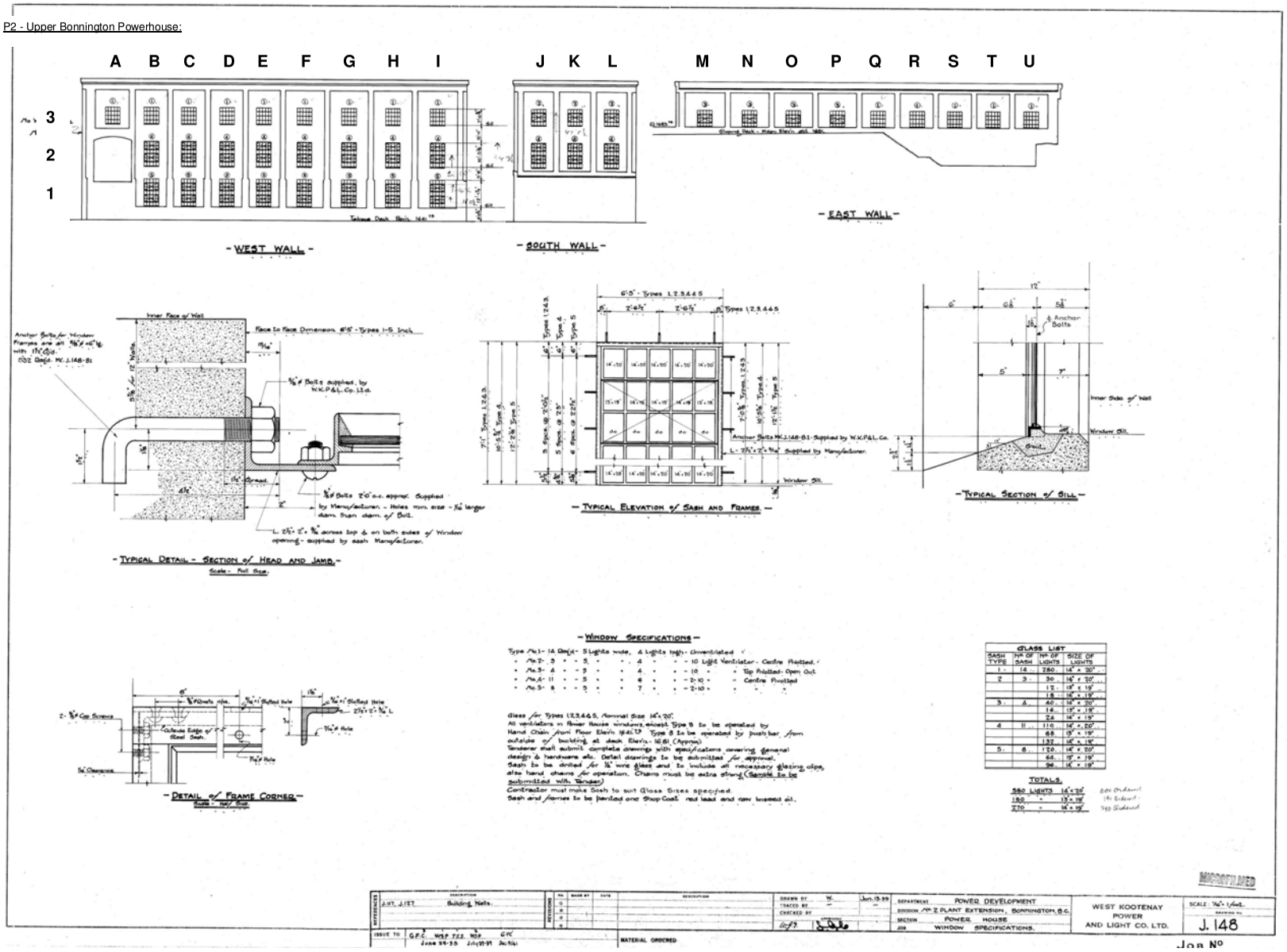




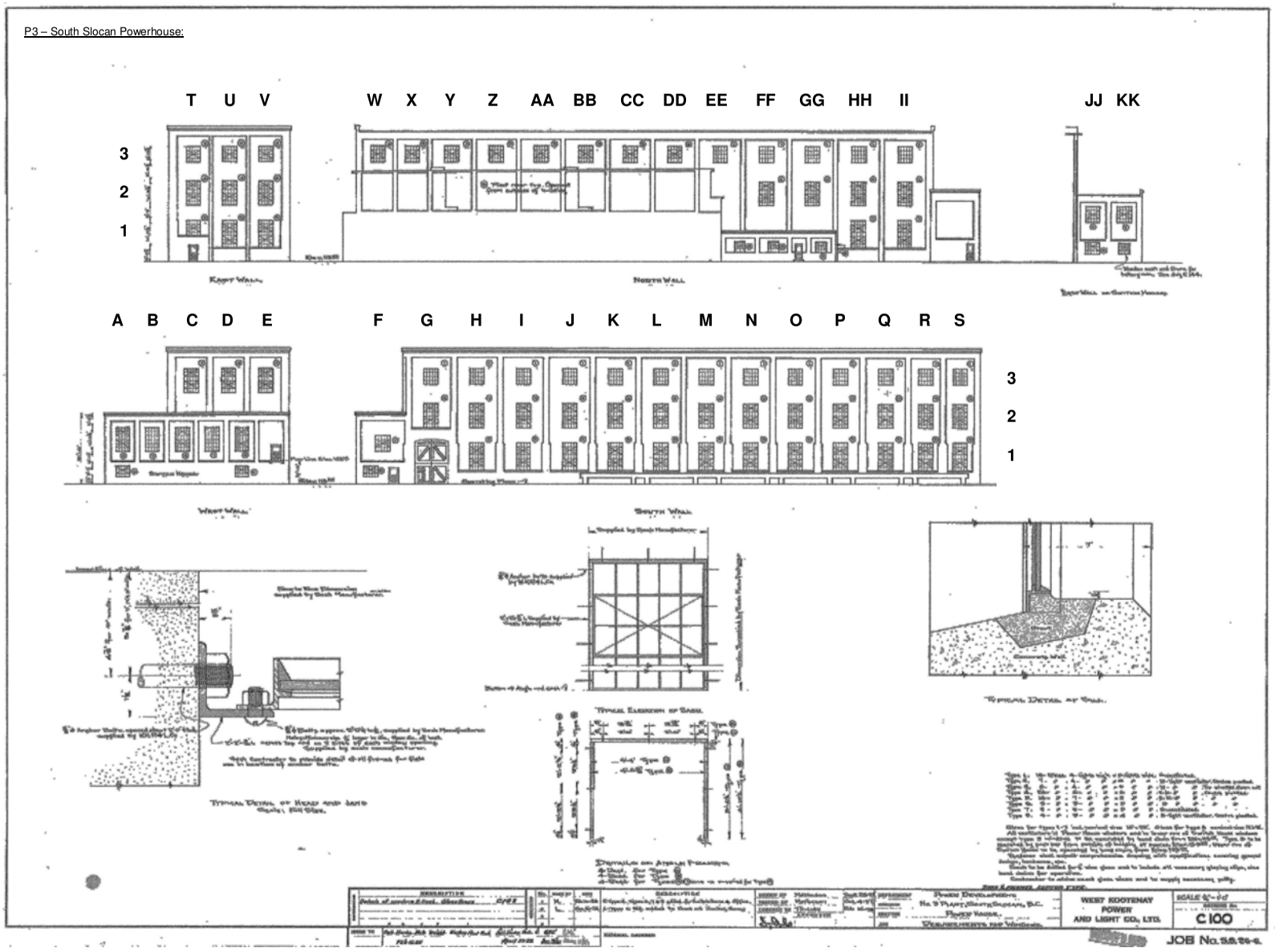
Plan View of Typical Window



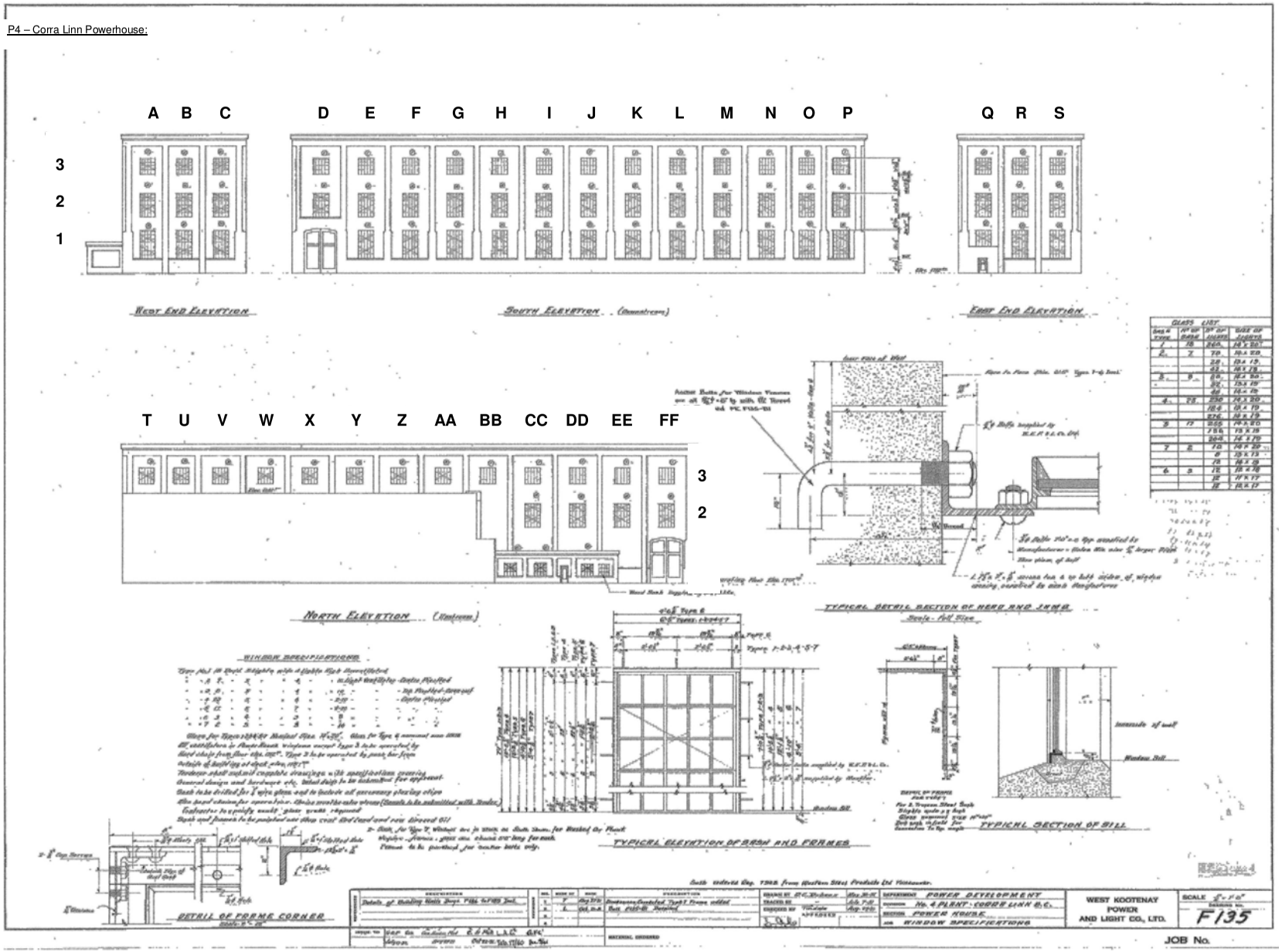
P2 - Upper Bonnington Powerhouse:



P3 – South Slocan Powerhouse:



P4 – Corra Linn Powerhouse:



UTILITIES COMMISSION ACT

Published by Quickscribe Services Ltd.

UTILITIES COMMISSION ACT

CHAPTER 473 [RSBC 1996]

[includes 2008 Bill 15, c. 13 amendments (effective May 1, 2008)]

Contents

Definitions

1. In this Act:

"appraisal" means appraisal by the commission;

"authority" means the British Columbia Hydro and Power Authority;

"commission" means the British Columbia Utilities Commission continued under this Act;

"compensation" means a rate, remuneration, gain or reward of any kind paid, payable, promised, demanded, received or expected, directly or indirectly, and includes a promise or undertaking by a public utility to provide service as consideration for, or as part of, a proposal or contract to dispose of land or any interest in it;

"costs" includes fees, counsel fees and expenses;

(ADD) May 01/08 **"demand-side measure"** means a rate, measure, action or program undertaken

(a) to conserve energy or promote energy efficiency,
(b) to reduce the energy demand a public utility must serve, or
(c) to shift the use of energy to periods of lower demand;

"distribution equipment" means posts, pipes, wires, transmission mains, distribution mains and other apparatus of a public utility used to supply service to the utility customers;

"expenses" includes expenses of the commission;

(ADD) May 01/08

"government's energy objectives" means the following objectives of the government:

(a) to encourage public utilities to reduce greenhouse gas emissions;

(b) to encourage public utilities to take demand-side measures;

(c) to encourage public utilities to produce, generate and acquire electricity from clean or renewable sources;

(d) to encourage public utilities to develop adequate energy transmission infrastructure and capacity in the time required to serve persons who receive or may receive service from the public utility;

(e) to encourage public utilities to use innovative energy technologies

(i) that facilitate electricity self-sufficiency or the fulfillment of their long-term transmission requirements, or

(ii) that support energy conservation or efficiency or the use of clean or renewable sources of energy;

(f) to encourage public utilities to take prescribed actions in support of any other goals prescribed by regulation;

"petroleum industry" includes the carrying on within British Columbia of any of the following industries or businesses:

(a) the distillation, refining or blending of petroleum;

(b) the manufacture, refining, preparation or blending of products obtained from petroleum;

(c) the storage of petroleum or petroleum products;

(d) the wholesale or retail distribution or sale of petroleum products;

(e) the retail distribution of liquefied or compressed natural gas;

"petroleum products" includes gasoline, naphtha, benzene, kerosene, lubricating oils, stove oil, fuel oil, furnace oil, paraffin, aviation fuels, butane, propane and other liquefied petroleum gas and all derivatives of petroleum and all products obtained from petroleum, whether or not blended with or added to other things;

"public hearing" means a hearing of which public notice is given, which is open to the public, and at which any person whom the commission determines to have an interest in the matter may be heard;

"public utility" means a person, or the person's lessee, trustee, receiver or liquidator, who owns or operates in British Columbia, equipment or facilities for

(a) the production, generation, storage, transmission, sale, delivery or provision of electricity, natural gas, steam or any other agent for the production of light, heat, cold or power to or for the public or a corporation for compensation, or

(b) the conveyance or transmission of information, messages or communications by guided or unguided electromagnetic waves, including systems of cable, microwave, optical fibre or radiocommunications if that service is offered to the public for compensation,

but does not include

(c) a municipality or regional district in respect of services provided by the municipality or regional district within its own boundaries,

(d) a person not otherwise a public utility who provides the service or commodity only to the person or the person's employees or tenants, if the

service or commodity is not resold to or used by others,

(e) a person not otherwise a public utility who is engaged in the petroleum industry or in the wellhead production of oil, natural gas or other natural petroleum substances,

(f) a person not otherwise a public utility who is engaged in the production of a geothermal resource, as defined in the *Geothermal Resources Act*, or

(ADD) Feb 27/03 (g) a person, other than the authority, who enters into or is created by, under or in furtherance of an agreement designated under section 12 (9) of the *Hydro and Power Authority Act*, in respect of anything done, owned or operated under or in relation to that agreement;

"rate" includes

(a) a general, individual or joint rate, fare, toll, charge, rental or other compensation of a public utility,

(b) a rule, practice, measurement, classification or contract of a public utility or corporation relating to a rate, and

(c) a schedule or tariff respecting a rate;

"service" includes

(a) the use and accommodation provided by a public utility,

(b) a product or commodity provided by a public utility, and

(c) the plant, equipment, apparatus, appliances, property and facilities employed by or in connection with a public utility in providing service or a product or commodity for the purposes in which the public utility is engaged and for the use and accommodation of the public;

"tenant" does not include a lessee for a term of more than 5 years;

(ADD) May 01/08 **"transmission corporation"** has the same meaning as in the *Transmission Corporation Act*;

"value" or **"appraised value"** means the value determined by the commission.

1980-60-1; 1982-54-1; 1983-10-23; 1985-52-91; 2003-1-25; 2008-13-1.

PART 1 – Utilities Commission

Commission continued

(SUB) Feb 13/04 **2.** (1) The British Columbia Utilities Commission is continued consisting of individuals appointed as follows by the Lieutenant Governor in Council after a merit based process:

(a) one commissioner designated as the chair;

(b) other commissioners appointed after consultation with the chair.

(2) The Lieutenant Governor in Council, after consultation with the chair, may designate a commissioner appointed under subsection (1) (b) as a deputy chair.

(3) The chair may appoint a deputy chair or commissioner to act as chair for any purpose specified in the appointment.

(AM) May 01/08 (4) Sections 1 to 13, 15, 18 to 21, 28 to 30, 32, 34 (3) and (4), 35 to 42, 44, 46.3, 48, 49, 54, 56, 60 (a) and (b) and 61 of the *Administrative Tribunals Act* apply to the commission, and for that purpose a reference to a deputy chair in this Act is a reference to a vice chair under that Act.

(5) The chair is the chief executive officer of the commission and has supervision over and direction of the work and the staff of the commission.

2003-47-63; 2004-45-163; 2007-14-66 (B.C. Reg. 311/2007); 2008-15-2.

Commission subject to direction

(SUB)
May
01/08

3. (1) Subject to subsection (3), the Lieutenant Governor in Council, by regulation, may issue a direction to the commission with respect to the exercise of the powers and the performance of the duties of the commission, including, without limitation, a direction requiring the commission to exercise a power or perform a duty, or to refrain from doing either, as specified in the regulation.

(2) The commission must comply with a direction issued under subsection (1), despite

(a) any other provision of

(i) this Act, except subsection (3) of this section, or

(ii) the regulations, or

(b) any previous decision of the commission.

(3) The Lieutenant Governor in Council may not under subsection (1) specifically and expressly

(a) declare an order or decision of the commission to be of no force or effect, or

(b) require the commission to rescind an order or a decision.

2008-15-3.

Sittings and divisions

4. (1) The commission

(a) must sit at the times and conduct its proceedings in a manner it considers convenient for the proper discharge and speedy dispatch of its duties under this Act.

(REP)
Nov
19/04

(b) *Repealed.* [2004-45-164]

(SUB)
May
29/03

(2) The chair may organize the commission into divisions.

(3) The commissioners must sit

(a) as the commission, or

(b) as a division of the commission.

(4) If commissioners sit as a division

(a) 2 or more divisions may sit at the same time,

(b) the division has all the jurisdiction of and may exercise and perform the powers and duties of the commission, and

(c) a decision or action of the division is a decision or action of the commission.

(SUB)
May
29/03

(5) At a sitting of the commission or of a division of the commission, one commissioner is a quorum.

(SUB)
May
29/03

(6) The chair may designate a commissioner to serve as chair at any sitting of the commission or a division of it.

(7) If a proceeding is being held by the commission or by a division and a sitting commissioner is absent or unable to attend,

(a) that commissioner is thereafter disqualified from continuing to sit on the proceeding, and

(b) despite subsection (5), the commissioner or commissioners remaining present and sitting must exercise and perform all the jurisdiction, powers and duties of the commission.

(REP) May 29/03 (8) *Repealed.* [2003-46-2]

(REP) May 29/03 (9) *Repealed.* [2003-46-2]

(ADD) Nov 19/04 (10) In the case of a tie vote at a sitting of the commission or a division of the commission, the decision of the chair of the commission or the division governs.

(ADD) Nov 19/04 (11) If a division is comprised of one member and that member is unable for any reason to complete the member's duties, the chair of the commission, with the consent of all parties to the application, may organize a new division to continue to hear and determine the matter on terms agreed to by the parties, and the vacancy does not invalidate the proceeding.

1980-60-5; 1982-54-2; 1994-35-98; 2003-46-2; 2004-45-164.

Commission's duties

(ADD) May 01/08 **5.** (.1) In this section, **"minister"** means the minister responsible for the administration of the *Hydro and Power Authority Act*.

(1) On the request of the Lieutenant Governor in Council, it is the duty of the commission to advise the Lieutenant Governor in Council on any matter, whether or not it is a matter in respect of which the commission otherwise has jurisdiction.

(2) If, under subsection (1), the Lieutenant Governor in Council refers a matter to the commission, the Lieutenant Governor in Council may specify terms of reference requiring and empowering the commission to inquire into the matter.

(AM) May 01/08 (3) The commission may carry out a function or perform a duty delegated to it under an enactment of British Columbia or Canada.

(ADD) May 01/08 (4) The commission, in accordance with subsection (5), must conduct an inquiry to make determinations with respect to British Columbia's infrastructure and capacity needs for electricity transmission for the period ending 20 years after the day the inquiry begins or, if the terms of reference given under subsection (6) specify a different period, for that period.

(ADD) May 01/08 (5) An inquiry under subsection (4) must begin

(a) by March 31, 2009, and

(b) at least once every 6 years after the conclusion of the previous inquiry,

unless otherwise ordered by the Lieutenant Governor in Council.

(ADD) May 01/08 (6) For an inquiry under subsection (4), the minister may specify, by order, terms of reference requiring and empowering the commission to inquire into the matter referred to in that subsection, including terms of reference regarding the manner in which and the time by which the commission must issue its determinations under subsection (4).

(ADD) May 01/08 (7) The minister may declare, by regulation, that the commission may not, during the period specified in the regulation, reconsider, vary or rescind a determination made under subsection (4).

(ADD) May 01/08 (8) Despite section 75, if a regulation is made for the purposes of subsection (7) of this section with respect to a determination, the commission is bound by that determination in any hearing or proceeding held during the period specified in the regulation.

(ADD) May 01/08 (9) The commission may order a public utility to submit an application under section 46, by the time specified in the order, in relation to a determination made under subsection (4).

1980-60-6; 1994-35-99; 2007-14-201 (B.C. Reg. 354/2007); 2008-13-4.

Repealed

(REP) Nov 19/04

6. *Repealed.* [2004-45-165]

Employees

7. Despite the *Public Service Act*, the commission may employ a secretary and other officers and other employees it considers necessary and may determine their duties, conditions of employment and remuneration.

1980-60-8.

Technical consultants

8. The commission may appoint or engage persons having special or technical knowledge necessary to assist the commission in carrying out its functions.

1980-60-9.

Pensions

(AM) Apr 01/00

9. The Lieutenant Governor in Council may, by order, direct that the Public Service Pension Plan, continued under the *Public Sector Pension Plans Act*, applies to commissioners, officers and other employees of the commission, but the commission may, alone or in cooperation with other corporations, departments, commissions or other agencies of the Crown, establish, support or participate in any one or more of

(a) a pension or superannuation plan, or

(b) a group insurance plan

for the benefit of commissioners, officers and other employees of the commission and their dependants.

1980-60-10; 1999-44-111.

Secretary's duties

10. (1) The secretary must

(a) keep a record of the proceedings before the commission,

(b) ensure that every rule, regulation and order of the commission is filed in the records of the commission,

(c) have custody of all rules, regulations and orders made by the commission and all other records and documents of, or filed with, the commission, and

(AM) Dec 01/07

(d) carry out the instructions and directions of the commission under this Act respecting the secretary's duties or office.

(2) On the application of a person who pays a prescribed fee, the secretary must deliver to the person a certified copy of any rule, regulation or order of the commission.

(3) In the absence of the secretary, the duties of the secretary under this Act may be performed by another person appointed by the commission.

(4) A rule, regulation and order of the commission must be signed by the chair, a deputy chair or an acting chair, and the original or a copy of it must be delivered to the secretary for filing.

1980-60-11; 1982-54-3; 2007-14-215 (B.C. Reg. 354/2007).

Conflict of interest

11. (1) A commissioner or employee of the commission must not, directly or indirectly,

(AM) May 29/03

(a) hold, acquire or have a beneficial interest in a share, stock, bond, debenture or other security of a corporation or other person subject to regulation under Part 3 of this Act,

(b) have a significant beneficial interest in a device, appliance, machine, article, patent or patented process, or a part of it, that is required or used by a corporation or other person referred to in paragraph (a) for the purpose of its equipment or service, or

(c) have a significant beneficial interest in a contract for the construction of works or the provision of a service for or by a corporation or other person referred to in paragraph (a).

(2) A commissioner or employee of the commission, in whom a beneficial interest referred to in subsection (1) is or becomes vested, must divest himself or herself of the beneficial interest within 3 months after appointment to the commission or acquisition of the property, as the case may be.

(3) The use or purchase for personal or domestic purposes, of gas, heat, light, power, electricity or petroleum products or service from a corporation or other person subject to regulation under this Act is not a contravention of this section, and does not disqualify a commissioner or employee from acting in any matter affecting that corporation or other person.

1980-60-12; 2003-46-3.

Obligation to keep information confidential

12. (1) Every commissioner and every officer and employee of the commission must keep secret all information coming to the person's knowledge during the course of the administration of this Act, except insofar as disclosure is necessary for the administration of this Act or insofar as the commission authorizes the person to release the information.

(SUB) Oct 15/04

(2) A commissioner, officer or employee of the commission must not be required to testify or produce evidence in any proceeding, other than a criminal proceeding, about records or information obtained in the discharge of duties under this Act.

(ADD) Oct 15/04

(3) Despite subsection (2), the Supreme Court may require the commission to produce the record of a proceeding that is the subject of an application for judicial review under the *Judicial Review Procedure Act*.

1980-60-13, 14; 2004-45-166.

Annual report

(AM) May 29/03

13. (1) In each year, the commission must make a report to the Lieutenant Governor in Council for the preceding fiscal year, setting out briefly

(a) all applications and complaints to the commission under this Act and summaries of the commission's findings on them,

(b) other matters that the commission considers to be of public interest in connection with the discharge of its duties under this Act, and

(c) other information the Lieutenant Governor in Council directs.

(2) The report must be laid before the Legislative Assembly as soon as possible after it is submitted to the Lieutenant Governor in Council.

1980-60-15; 2003-46-4.

PART 2

14. to 20. Repealed

(REP) May 29/03 **14.** Sections **14.** to **20.** *Repealed.* [2003-46-5]

PART 3 – Regulation of Public Utilities

Application of this Part

21. (1) This Part applies only to a public utility that is subject to the legislative authority of the Province.

(2) The provision by a public utility of a class of service in respect of which the public utility is not subject to the legislative authority of the Province does not make this Part inapplicable to that public utility in respect of any other class of service.

1980-60-26.

(SUB)**Exemptions** May 01/08

22. (1) In this section:

"eligible person" means a person, or a class of persons, that

(a) generates, produces, transmits, distributes or sells electricity,

(b) for the purpose of heating or cooling any building, structure or equipment or for any industrial purpose, heats, cools or refrigerates water, air or any heating medium or coolant, using for that purpose equipment powered by a fuel, a geothermal resource or solar energy, or

(c) enters into an energy supply contract, within the meaning of section 68, for the provision of electricity;

"minister" means the minister responsible for the administration of the *Hydro and Power Authority Act*.

(2) The minister, by regulation, may

(a) exempt from any or all of section 71 and the provisions of this Part

(i) an eligible person, or

(ii) an eligible person in respect of any equipment, facility, plant, project, activity, contract, service or system of the eligible person, and

(b) in respect of an exemption made under paragraph (a), impose any terms and conditions the minister considers to be in the public interest.

(3) The minister, before making a regulation under subsection (2), may refer the matter to the commission for a review.

2008-13-5.

General supervision of public utilities

23. (1) The commission has general supervision of all public utilities and may make orders about

(a) equipment,

(b) appliances,

(c) safety devices,

(d) extension of works or systems,

(e) filing of rate schedules,

(f) reporting, and

(g) other matters it considers necessary or advisable for

(i) the safety, convenience or service of the public, or

(ii) the proper carrying out of this Act or of a contract, charter or franchise involving use of public property or rights.

(2) Subject to this Act, the commission may make regulations requiring a public utility to conduct its operations in a way that does not unnecessarily interfere with, or cause unnecessary damage or inconvenience to, the public.

1980-60-28; 1983-10-23.

Commission must make examinations and inquiries

24. In its supervision of public utilities, the commission must make examinations and conduct inquiries necessary to keep itself informed about

(a) the conduct of public utility business,

(b) compliance by public utilities with this Act, regulations or any other law, and

(c) any other matter in the commission's jurisdiction.

1980-60-29.

Commission may order improved service

25. If the commission, after a hearing held on its own motion or on complaint, finds that the service of a public utility is unreasonable, unsafe, inadequate or unreasonably discriminatory, the commission must

(a) determine what is reasonable, safe, adequate and fair service, and

(b) order the utility to provide it.

1980-60-30.

Commission may set standards

26. After a hearing held on the commission's own motion or on complaint, the commission may do one or more of the following:

(a) determine and set just and reasonable standards, classifications, rules, practices or service to be used by a public utility;

(b) determine and set adequate and reasonable standards for measuring quantity, quality, pressure, initial voltage or other conditions of supplying service;

(c) prescribe reasonable regulations for examining, testing or measuring a service;

(d) establish or approve reasonable standards for accuracy of meters and other measurement appliances;

(e) provide for the examination and testing of appliances used to measure a service of a utility.

1980-60-31; 1983-10-21.

Joint use of facilities

27. (1) If the commission, after a hearing, finds that

(a) public convenience and necessity require the use by a public utility of conduits, subways, poles, wires or other equipment belonging to another public utility, and

(b) the use will not prevent the owner or other users from performing their duties or result in any substantial detriment to their service,

the commission may, if the utilities fail to agree on the use, conditions or compensation, make an order it considers reasonable, directing that the use or joint use of the conduits, subways, poles, wires or other equipment be allowed and prescribing conditions of and compensation for the use.

(2) If the commission, after a hearing, finds that the provision of adequate service by one public utility or the safety of the persons operating or using that service requires that wires or cables carrying electricity and run, placed, erected, maintained or used by another public utility be placed, constructed or equipped with safety devices, the commission may make an order it considers reasonable about the placing, construction or equipment.

(3) By the same or a later order, the commission may

(a) direct that the cost of the placing, construction or equipment be at the expense of the public utility whose wire, cable or apparatus was most recently placed, or

(b) in the discretion of the commission, apportion the cost between the utilities.

1980-60-32.

Utility must provide service if supply line near

28. (1) On being requested by the owner or occupier of the premises to do so, a public utility must supply its service to premises that are located within 90 metres of its supply line or any lesser distance that the commission prescribes suitable for that purpose.

(2) Before supplying the service under subsection (1) or making a connection for the purpose, or as a condition of continuing to supply the service, the public utility may require the owner or occupier to give reasonable security for repayment of the costs of making the connection as set out in the filed schedule of rates.

(AM) Dec 01/07

(3) After a hearing and for proper cause, the commission may relieve a public utility from the obligation to supply service under this Act on terms the commission considers proper and in the public interest.

1980-60-33; 2007-14-213 (B.C. Reg. 354/2007).

Commission may order utility to provide service if supply line distant

29. On the application of a person whose premises are located more than 90 metres from a supply line suitable for that purpose, the commission may order a public utility that controls or operates the line

(a) to supply, within the time the commission directs, the service required by that person, and

(b)

to make extensions and install necessary equipment and apparatus on terms the commission directs, which terms may include payment of all or part of the cost by the applicant.

1980-60-34; 1982-54-14.

Commission may order extension of existing service

30. If the commission, after a hearing, determines that

(a) an extension of the existing services of a public utility, in a general area that the public utility may properly be considered responsible for developing, is feasible and required in the public interest, and

(b) the construction and maintenance of the extension will not necessitate a substantial increase in rates chargeable, or a decrease in services provided, by the utility elsewhere,

the commission may order the utility to make the extension on terms the commission directs, which may include payment of all or part of the cost by the persons affected.

1980-60-35; 1982-54-15.

Regulation of agreements

31. The commission may make rules governing conditions to be contained in agreements entered into by public utilities for their regulated services or for a class of regulated service.

1980-60-36.

Use of municipal thoroughfares

32. (1) This section applies if a public utility

(a) has the right to enter a municipality to place its distribution equipment on, along, across, over or under a public street, lane, square, park, public place, bridge, viaduct, subway or watercourse, and

(b) cannot come to an agreement with the municipality on the use of the street or other place or on the terms of the use.

(2) On application and after any inquiry it considers advisable, the commission may, by order, allow the use of the street or other place by the public utility for that purpose and specify the manner and terms of use.

1980-60-37; 1983-10-21.

Dispensing with municipal consent

33. (1) This section applies if a public utility

(a) cannot agree with a municipality respecting placing its distribution equipment on, along, across, over or under a public street, lane, square, park, public place, bridge, viaduct, subway or watercourse in a municipality, and

(b) the public utility is otherwise unable, without expenditures that the commission considers unreasonable, to extend its system, line or apparatus from a place where it lawfully does business to another place where it is authorized to do business.

(2) On application and after a hearing, for the purpose of that extension only and without unduly preventing the use of the street or other place by other persons, the commission may, by order,

(a) allow the use of the street or other place by the public utility, despite any law or contract granting to another person exclusive rights, and

(b) specify the manner and terms of the use.

1980-60-38; 1983-10-21.

Order to extend service in municipality

34. (1) On the complaint of a municipality that a public utility doing business in the municipality fails to extend its service to a part of the municipality, and after any hearing the commission considers advisable, the commission may order the public utility to extend its service in a way that the commission considers reasonable and proper.

(2) An order under subsection (1) may

(a) in the commission's discretion, impose terms for the extension, including the expenditure to be incurred for all necessary works, and

(b) apportion the cost between the public utility, the municipality and consumers receiving service from the extension.

1980-60-39.

Other orders to extend service

35. If the commission, after a hearing, concludes that in its opinion an extension by a public utility of its existing service would provide sufficient business to justify the construction and maintenance of the extension, and the financial condition of the public utility reasonably warrants the capital expenditure required, the commission may order the utility to extend its service to the extent the commission considers reasonable and proper.

1980-60-40.

Use of municipal structures

36. Subject to any agreement between a public utility and a municipality and to the franchise or rights of the public utility, and after any hearing the commission considers advisable, the commission may, by order, specify the terms on which the public utility may use for any purpose of its service

(a) a highway in the municipality, or

(b) a public bridge, viaduct or subway constructed or to be constructed by the municipality alone or jointly with another municipality, corporation or government.

1980-60-41; 1983-10-21.

Supervisors and inspectors

37. (1) If the commission considers that a supervisor or inspector should be appointed to supervise or inspect, continuously or otherwise, the system, works, plant, equipment or service of a public utility with a view to establishing and carrying out measures for

(a) the safety of the public and of the users of the utility's service, or

(b) adequacy of service,

the commission may appoint a supervisor or inspector for that utility and may specify the person's duties.

(2) The commission may

(a) set the salary and expenses of a supervisor or inspector appointed under subsection (1), and

(b) order the amount set

(i) to be borne by the municipality in which the operations of the public utility are carried on or its service is provided, or

(ii) to be borne or apportioned in a way the commission considers equitable.

1980-60-42, 43; 1983-10-21.

Public utility must provide service

38. A public utility must

(a) provide, and

(b) maintain its property and equipment in a condition to enable it to provide,

a service to the public that the commission considers is in all respects adequate, safe, efficient, just and reasonable.

1980-60-44.

No discrimination or delay in service

39. On reasonable notice, a public utility must provide suitable service without undue discrimination or undue delay to all persons who

(a) apply for service,

(b) are reasonably entitled to it, and

(c) pay or agree to pay the rates established for that service under this Act.

(AM) Dec 01/07

1980-60-45; 2007-14-215 (B.C. Reg. 354/2007).

Exemption for part of municipality

40. (1) On application, the commission may, by order, exempt a municipality from section 39 except in a defined area.

(2) On application by any person and after notice to the municipality, the commission may enlarge or reduce an area defined under subsection (1).

1980-60-46.

No discontinuance without permission

41. A public utility that has been granted a certificate of public convenience and necessity or a franchise, or that has been deemed to have been granted a certificate of public convenience and necessity, and has begun any operation for which the certificate or franchise is necessary, or in respect of which the certificate is deemed to have been granted, must not cease the operation or a part of it without first obtaining the permission of the commission.

1980-60-47.

Duty to obey orders

42. A public utility must obey the lawful orders of the commission made under this Act for its business or service, and must do all things necessary to secure observance of those orders by its officers, agents and employees.

1980-60-48.

Duty to provide information

(SUB) May 01/08

43. (1) A public utility must, for the purposes of this Act,

(a) answer specifically all questions of the commission, and

(b) provide to the commission

(i) the information the commission requires, and

(ii) a report, submitted annually and in the manner the commission requires, regarding the demand-side measures taken by the public utility during the period addressed by the report, and the effectiveness of those measures.

(ADD) May 01/08

(1.1) The authority, in addition to providing the information and reports referred to in subsection (1), must provide to the commission, in accordance with the regulations, an annual report comparing the electricity rates charged by the authority with electricity rates charged by public utilities in other jurisdictions in North America, including an assessment of whether the authority's electricity rates are competitive with those other rates.

(2) A public utility that receives from the commission any form of return must fully and correctly answer each question in the return and deliver it to the commission.

(3) On request by the commission, a public utility must deliver to the commission

(a) all profiles, contracts, reports of engineers, accounts and records in its possession or control relating in any way to its property or service or affecting its business, or verified copies of them, and

(b) complete inventories of the utility's property in the form the commission directs.

(4) On request by the commission, a public utility must file with the commission a statement in writing setting out the name, title of office, post office address and the authority, powers and duties of

(a) every member of the board of directors and the executive committee,

(b) every trustee, superintendent, chief or head of construction or operation, or of any department, branch, division or line of construction or operation, and

(c) other officers of the utility.

(5) The statement required under subsection (4) must be filed in a form that discloses the source and origin of each administrative act, rule, decision, order or other action of the utility.

1980-60-49; 2008-13-6.

Duty to keep records

44. (1) A public utility must have in British Columbia an office in which it must keep all accounts and records required by the commission to be kept in British Columbia.

(2)

A public utility must not remove or permit to be removed from British Columbia an account or record required to be kept under subsection (1), except on conditions specified by the commission.

1980-60-50; 1983-10-21.

(ADD)**Long-term resource and conservation planning**
May
01/08

44.1 (1) In this section, **"demand increase"** means the greater of

(a) the difference between

(i) the sum of the estimate referred to in subsection (4) (b) and a prescribed amount, if any, and

(ii) the demand the authority would serve during the period referred to in subsection (4) (b) if the demand in each year of that period remains equal to the demand referred to in subsection (4) (a), and

(b) zero.

(2) Subject to subsection (4), a public utility must file with the commission, in the form and at the times the commission requires, a long-term resource plan including all of the following:

(a) an estimate of the demand for energy the public utility would expect to serve if the public utility does not take new demand-side measures during the period addressed by the plan;

(b) a plan of how the public utility intends to reduce the demand referred to in paragraph (a) by taking cost-effective demand-side measures;

(c) an estimate of the demand for energy that the public utility expects to serve after it has taken cost-effective demand-side measures;

(d) a description of the facilities that the public utility intends to construct or extend in order to serve the estimated demand referred to in paragraph (c);

(e) information regarding the energy purchases from other persons that the public utility intends to make in order to serve the estimated demand referred to in paragraph (c);

(f) an explanation of why the demand for energy to be served by the facilities referred to in paragraph (d) and the purchases referred to in paragraph (e) are not planned to be replaced by demand-side measures;

(g) any other information required by the commission.

(3) The commission may exempt a public utility from the requirement to include in a long-term resource plan filed under subsection (2) any of the information referred to in paragraphs (a) to (f) of that subsection if the commission is satisfied that the information is not applicable with respect to the nature of the service provided by the public utility.

(4) A long-term resource plan filed under subsection (2) by the authority before the end of the 2020 calendar year must include, in addition to everything referred to in subsection (2) (a) to (g), all of the following:

(a) a statement of the demand for electricity the authority served in the year beginning on April 1, 2007, and ending on March 31, 2008;

(b) an estimate of the total demand for electricity the authority would expect to serve in the period beginning on April 1, 2008, and ending on March 31, 2021, if no new demand-side measures are taken during that period;

(c) a statement of the demand-side measures the authority would need to take so that, in combination with demand-side measures taken by the government of British Columbia or of Canada or a local authority, the

demand increase would be reduced by 50% by 2020.

(5) The commission may establish a process to review long-term resource plans filed under subsection (2).

(6) After reviewing a long-term resource plan filed under subsection (2), the commission must

(a) accept the plan, if the commission determines that carrying out the plan would be in the public interest, or

(b) reject the plan.

(7) The commission may accept or reject, under subsection (6), a part of a public utility's plan, and, if the commission rejects a part of a plan,

(a) the public utility may resubmit the part within a time specified by the commission, and

(b) the commission may accept or reject, under subsection (6), the part resubmitted under paragraph (a) of this subsection.

(8) In determining under subsection (6) whether to accept a long-term resource plan, the commission must consider

(a) the government's energy objectives,

(b) whether the plan is consistent with the requirements under sections 64.01 and 64.02, if applicable,

(c) whether the plan shows that the public utility intends to pursue adequate, cost-effective demand-side measures, and

(d) the interests of persons in British Columbia who receive or may receive service from the public utility.

(9) In accepting under subsection (6) a long-term resource plan, or part of a plan, the commission may do one or both of the following:

(a) order that a proposed utility plant or system, or extension of either, referred to in the accepted plan or the part is exempt from the operation of section 45 (1);

(b) order that, despite section 75, a matter the commission considers to be adequately addressed in the accepted plan or the part is to be considered as conclusively determined for the purposes of any hearing or proceeding to be conducted by the commission under this Act, other than a hearing or proceeding for the purposes of section 99.

2008-13-7.

(ADD)**Expenditure schedule**
May
01/08

44.2 (1) A public utility may file with the commission an expenditure schedule containing one or more of the following:

(a) a statement of the expenditures on demand-side measures the public utility has made or anticipates making during the period addressed by the schedule;

(b) a statement of capital expenditures the public utility has made or anticipates making during the period addressed by the schedule;

(c) a statement of expenditures the public utility has made or anticipates making during the period addressed by the schedule to acquire energy from other persons.

(2) The commission may not consent under section 61 (2) to an amendment to or a rescission of a schedule filed under section 61 (1) to the extent that the amendment or the rescission is for the purpose of recovering expenditures

referred to in subsection (1) (a) of this section, unless

(a) the expenditure is the subject of a schedule filed and accepted under this section, or

(b) the amendment or rescission is for the purpose of setting an interim rate.

(3) After reviewing an expenditure schedule submitted under subsection (1), the commission, subject to subsections (5) and (6), must

(a) accept the schedule, if the commission considers that making the expenditures referred to in the schedule would be in the public interest, or

(b) reject the schedule.

(4) The commission may accept or reject, under subsection (3), a part of a schedule.

(5) In considering whether to accept an expenditure schedule, the commission must consider

(a) the government's energy objectives,

(b) the most recent long-term resource plan filed by the public utility under section 44.1, if any,

(c) whether the schedule is consistent with the requirements under section 64.01 or 64.02, if applicable,

(d) if the schedule includes expenditures on demand-side measures, whether the demand-side measures are cost-effective within the meaning prescribed by regulation, if any, and

(e) the interests of persons in British Columbia who receive or may receive service from the public utility.

(6) If the commission considers that an expenditure in an expenditure schedule was determined to be in the public interest in the course of determining that a long-term resource plan was in the public interest under section 44.1 (6),

(a) subsection (5) of this section does not apply with respect to that expenditure, and

(b) the commission must accept under subsection (3) the expenditure in the expenditure schedule.

2008-13-7.

Certificate of public convenience and necessity

45. (1) Except as otherwise provided, after September 11, 1980, a person must not begin the construction or operation of a public utility plant or system, or an extension of either, without first obtaining from the commission a certificate that public convenience and necessity require or will require the construction or operation.

(2) For the purposes of subsection (1), a public utility that is operating a public utility plant or system on September 11, 1980 is deemed to have received a certificate of public convenience and necessity, authorizing it

(a) to operate the plant or system, and

(b) subject to subsection (5), to construct and operate extensions to the plant or system.

(AM) May 29/03

(3) Nothing in subsection (2) authorizes the construction or operation of an extension that is a reviewable project under the *Environmental Assessment Act*.

(4) The commission may, by regulation, exclude utility plant or categories of utility plant from the operation of subsection (1).

(5) If it appears to the commission that a public utility should, before constructing or operating an extension to a utility plant or system, apply for a separate certificate of public convenience and necessity, the commission may, not later than 30 days after construction of the extension is begun, order that subsection (2) does not apply in respect of the construction or operation of the extension.

(6) A public utility must file with the commission at least once each year a statement in a form prescribed by the commission of the extensions to its facilities that it plans to construct.

(REP) May 01/08

(6.1) and (6.2) *Repealed.* [2008-13-8]

(7) Except as otherwise provided, a privilege, concession or franchise granted to a public utility by a municipality or other public authority after September 11, 1980 is not valid unless approved by the commission.

(8) The commission must not give its approval unless it determines that the privilege, concession or franchise proposed is necessary for the public convenience and properly conserves the public interest.

(9) In giving its approval, the commission

(a) must grant a certificate of public convenience and necessity, and

(b) may impose conditions about

(i) the duration and termination of the privilege, concession or franchise, or

(ii) construction, equipment, maintenance, rates or service,

as the public convenience and interest reasonably require.

1980-60-51, 52; 1994-35-103; 2003-46-6; 2008-13-8.

Procedure on application

46. (1) An applicant for a certificate of public convenience and necessity must file with the commission information, material, evidence and documents that the commission prescribes.

(2) The commission has a discretion whether or not to hold any hearing on the application.

(AM) May 01/08

(3) Subject to subsections (3.1) and (3.2), the commission may issue or refuse to issue the certificate, or may issue a certificate of public convenience and necessity for the construction or operation of a part only of the proposed facility, line, plant, system or extension, or for the partial exercise only of a right or privilege, and may attach to the exercise of the right or privilege granted by the certificate, terms, including conditions about the duration of the right or privilege under this Act as, in its judgment, the public convenience or necessity may require.

(ADD) May 01/08

(3.1) In deciding whether to issue a certificate under subsection (3), the commission must consider

(a) the government's energy objectives,

(b) the most recent long-term resource plan filed by the public utility under section 44.1, if any, and

(c) whether the application for the certificate is consistent with the requirements imposed on the public utility under sections 64.01 and 64.02, if applicable.

(ADD) May 01/08

(3.2) Section (3.1) does not apply if the commission considers that the matters addressed in the application for the certificate were determined to be in the public interest in the course of considering a long-term resource plan under section 44.1.

(4) If a public utility desires to exercise a right or privilege under a consent, franchise, licence, permit, vote or other authority that it proposes to obtain but that has not, at the date of the application, been granted to it, the public utility may apply to the commission for an order preliminary to the issue of the certificate.

(5)

On application under subsection (4), the commission may make an order declaring that it will, on application, under rules it specifies, issue the desired certificate, on the terms it designates in the order, after the public utility has obtained the proposed consent, franchise, licence, permit, vote or other authority.

(6) On evidence satisfactory to the commission that the consent, franchise, licence, permit, vote or other authority has been secured, the commission must issue a certificate under section 45.

(7) The commission may amend a certificate previously issued, or issue a new certificate, for the purpose of renewing, extending or consolidating a certificate previously issued.

(8) A public utility to which a certificate is, or has been, issued, or to which an exemption is, or has been, granted under section 45 (4), is authorized, subject to this Act, to construct, maintain and operate the plant, system or extension authorized in the certificate or exemption.

1980-60-53; 1982-54-16; 1983-10-21, 23; 2008-13-9.

Order to cease work

47. (1) If a public utility

(a) is engaged, or is about to engage, in the construction or operation of a plant or system, and

(b) has not secured or has not been exempted from the requirement for, or is not deemed to have received a certificate of public convenience and necessity required under this Act,

any interested person may file a complaint with the commission.

(2) The commission may, with or without notice, make an order requiring the public utility complained of to cease the construction or operation until the commission makes and files its decision on the complaint, or until further order of the commission.

(3) The commission may, after a hearing, make the order and specify the terms under this Act that it considers advisable.

(4) If the commission considers it necessary to determine whether a person is engaged or is about to engage in construction or operation of any plant or system, the commission may request that person to provide information required by it and to answer specifically all questions of the commission, and the person must comply.

1980-60-54; 1983-10-21.

Cancellation or suspension of franchises and permits

48. (1) If the commission, after a hearing, determines that a public utility holding a franchise, licence or permit has failed to exercise or has not continued to exercise or use the right and privilege granted by the franchise, licence or permit, the commission may

(a) cancel the franchise, licence or permit, or

(b) suspend for a time the commission considers advisable the rights, or any of them, under the franchise, licence or permit.

(2) If a franchise, licence or permit is cancelled, the utility must cease to operate.

(3) If a right under a franchise, licence or permit is suspended, the utility must cease to exercise the suspended right during the period of suspension.

1980-60-55.

Accounts and reports

49. The commission may, by order, require every public utility to do one or more of the following:

(a) keep the records and accounts of the conduct of the utility's business that the commission may specify, and for public utilities of the same class, adopt a uniform system of accounting specified by the commission;

(b) provide, at the times and in the form and manner the commission specifies, a detailed report of finances and operations, verified as specified;

(c) file with the commission, at the times and in the form and manner the commission specifies, a report of every accident occurring to or on the plant, equipment or other property of the utility, if the accident is of such nature as to endanger the safety, health or property of any person;

(d) obtain from a board, tribunal, municipal or other body or official having jurisdiction or authority, permission, if necessary, to undertake or carry on a work or service ordered by the commission to be undertaken or carried on that is contingent on the permission.

1980-60-56; 1983-10-21.

Commission approval of issue of securities

50. (1) In this section, **"security"** means any share of any class of shares of a public utility or any bond, debenture, note or other obligation of a public utility whether secured or unsecured.

(2) Except in the case of a security evidencing indebtedness payable less than one year from its date, a public utility must not issue a security without first obtaining approval of the commission under this section and, if section 54 applies, under that section.

(3) Without first obtaining the commission's approval, a public utility must not,

(a) in respect of a security that it has issued,

(i) increase a fixed dividend or fixed interest rate,

(ii) alter a maturity date for the issue,

(iii) restrict the utility's right to redeem the issue,

(iv) increase the premium to be paid on redemption, or

(v) make a material alteration in the characteristics of the security, or

(b) purchase, redeem or otherwise acquire shares of any class of the utility except in accordance with any special rights or restrictions attached to them.

(4) Subsections (2) and (3) do not apply to the issue of shares under a genuine employee share purchase plan or genuine employee share option plan that has been filed with the commission.

(5) Without first obtaining the commission's approval, a public utility must not guarantee the payment of all or part of a loan or all or part of the interest on a loan made to another person.

(6) A public utility is not liable under a guarantee given by it after June 29, 1988, in contravention of subsection (5) or of a condition of approval imposed under

subsection (7).

(7) The commission may give its approval under this section subject to conditions and requirements considered necessary or desirable in the public interest.

(8) A municipality is not a utility for the purpose of this section.

1980-60-57; 1982-54-17; 1988-63-4.

Restraint on capitalization

51. A public utility must not do any of the following:

(a) capitalize a franchise or right to be a corporation;

(b) capitalize a franchise, licence, permit or concession in excess of the amount that, exclusive of tax or annual charge, is paid to the government, a municipality or other public authority as consideration for the franchise, licence, permit or concession;

(c) issue a security or evidence of indebtedness against a contract for consolidation, amalgamation, merger or lease.

1980-60-58.

Restraint on disposition

52. (1) Except for a disposition of its property in the ordinary course of business, a public utility must not, without first obtaining the commission's approval,

(a) dispose of or encumber the whole or a part of its property, franchises, licences, permits, concessions, privileges or rights, or

(b) by any means, direct or indirect, merge, amalgamate or consolidate in whole or in part its property, franchises, licences, permits, concessions, privileges or rights with those of another person.

(2) The commission may give its approval under this section subject to conditions and requirements considered necessary or desirable in the public interest.

1980-60-59; 1982-54-18.

Consolidation, amalgamation and merger

53. (1) A public utility must not consolidate, amalgamate or merge with another person

(a) unless the Lieutenant Governor in Council

(i) has first received from the commission a report under this section including an opinion that the consolidation, amalgamation or merger would be beneficial in the public interest, and

(ii) has, by order, consented to the consolidation, amalgamation or merger, and

(b) except in accordance with an order made under paragraph (a).

(2) The Lieutenant Governor in Council may, in an order under subsection (1) (a), include conditions and requirements that the Lieutenant Governor in Council considers necessary or advisable.

(3) An application for consent of the Lieutenant Governor in Council under subsection (1) must be made to the commission by the public utility.

(4) The commission must inquire into the application and may for that purpose hold a hearing.

(5) On conclusion of its inquiry, the commission must,

(a) if it is of the opinion that the consolidation, amalgamation or merger would be beneficial in the public interest, submit its report and findings to the Lieutenant Governor in Council, or

(b) dismiss the application.

(6) If a public utility gives notice to its shareholders of a meeting of shareholders in connection with a consolidation, amalgamation or merger, it must

(a) set out in the notice the provisions of this section, and

(b) file a copy of the notice with the commission at the time of mailing to the shareholders.

1980-60-60; 1982-54-19.

Reviewable interests

54. (1) In this section:

"child" includes a child in respect of whom a person referred to in the definition of "spouse" stands in the place of a parent;

"offeree" means a person to whom a take over bid is made;

"offeror" means a person, other than an agent, who makes a take over bid and includes 2 or more persons

(a) whose bids are made jointly or in concert, or

(b) who intend to exercise jointly or in concert any voting rights attaching to the shares for which a take over bid is made;

(SUB) Nov 01/00

"spouse" means a person who

(a) is married to another person, or

(b) is living and cohabiting with another person in a marriage-like relationship, including a marriage-like relationship between persons of the same gender, and has lived and cohabited in that relationship for a period of at least 2 years;

(AM) Feb 01/08

"take over bid" has the same meaning as in section 92 of the *Securities Act*;

"voting share" means a share that has, or may under any special rights or restrictions attached to the share have, the right to vote for the election of directors, and for this purpose **"share"** includes

(a) a security convertible into such a share, and

(b) options and rights to acquire such a share or such a convertible security.

(2) For the purposes of this section, persons are associates if any of the following apply:

(a) one of the persons is a corporation

(i) of which more than 10% of the shares outstanding of any class of the corporation are beneficially owned or controlled, directly or indirectly, by the other person, or

(ii) of which the other is a director or officer;

(b) each of the persons is a corporation and

(i) more than 10% of the shares outstanding of any class of shares of one are beneficially owned or controlled, directly or indirectly, by the other, or

(ii) more than 10% of the shares outstanding of any class of shares of each are beneficially owned or controlled, directly or indirectly, by

the same person;

(c) they are partners or one is a partnership of which the other is a partner;

(d) one is a trust in which the other has a substantial beneficial interest or for which the other serves as trustee or in a similar capacity;

(e) they are obligated to act in concert in exercising a voting right in respect of shares of the utility;

(f) one is the spouse or child of the other;

(g) one is a relative of the other or of the other's spouse and has the same home as the other.

(3) For the purpose of subsection (2), if a person has more than one associate, those associates are associates of each other.

(4) For the purpose of this section, a person has a reviewable interest in a public utility if

(a) the person owns or controls, or

(b) the person and the person's associates own or control,

in the aggregate more than 20% of the voting shares outstanding of any class of shares of the utility.

(5) A public utility must not, without the approval of the commission,

(a) issue, sell, purchase or register on its books a transfer of shares in the capital of the utility or create, or

(b) attach to any shares, whether issued or unissued, any special rights or restrictions,

if the issue, sale, purchase or registration or the creation or attachment of the special rights or restrictions would

(c) cause any person to have a reviewable interest,

(d) increase the percentage of voting shares owned by a person who has a reviewable interest,

(e) be a registration of a transfer of shares, the acquisition of which was contrary to subsection (7) or (8), or

(f) increase the voting rights attached to any shares owned by a person who has a reviewable interest.

(6) Failure of a public utility to comply with subsection (5) does not give rise to an offence if the public utility acts in the genuine belief based on an enquiry made with reasonable care, that the issue, sale, purchase or registration, or the creation or attachment of the special rights or restrictions, would not have the effects referred to in subsection (5) (c) to (f).

(7) A person must not acquire or acquire control of such numbers of any class of shares of a public utility as

(a) in themselves, or

(b) together with shares already owned or controlled by the person and the person's associates,

cause the person to have a reviewable interest in a public utility unless the person has obtained the commission's approval.

(8) Except if the acquisition or acquisition of control does not increase the percentage of voting shares held, owned or controlled by the person or by the person and the person's associates, a person having a reviewable interest in a public utility and any associate of that person must not acquire or acquire control of any voting shares in the public utility unless the person or associate has obtained the commission's approval.

(9) The commission may give its approval under this section subject to conditions

and requirements it considers necessary or desirable in the public interest, but the commission must not give its approval under this section unless it considers that the public utility and the users of the service of the public utility will not be detrimentally affected.

(10) If the commission determines that there has been a contravention of subsection (5), (7) or (8), the commission may, on notice to the public utility and after a hearing, make an order imposing on the public utility conditions and requirements respecting the management and operation of the utility.

(11) A proceeding must not be brought against the commission or the government by reason of the exercise by the commission of its powers under subsection (9) or (10).

(12) An offeror who makes a take over bid for shares of a public utility must

(a) file with the commission a copy of the take over bid and all supporting or supplementary material within 5 days after the date the material is first sent to offerees, and

(b) include in or attach to the take over bid a notice setting out the provisions of this section and stating the number, without duplication, and designation of any shares of the public utility held by the offeror and the offeror's associates.

(SUB) Dec 01/07

(13) Nothing in subsection (12) relieves a person from any requirement under the *Securities Act*.

1980-60-61; 1982-54-20; 1984-25-66; 1995-45-60; 2000-24-38; 2007-14-195 (B.C. Reg. 354/2007); 2006-32-70 (B.C. Reg. 15/2008).

Appraisal of utility property

55. (1) The commission may

(a) ascertain by appraisal the value of the property of a public utility, and

(b) inquire into every fact that, in its judgment, has a bearing on that value, including the amount of money actually and reasonably expended in the undertaking to provide service reasonably adequate to the requirements of the community served by the utility as that community exists at the time of the appraisal.

(2) In making its appraisal, the commission must have access to all records in the possession of a municipality or any ministry or board of the government.

(3) In making its appraisal under this section, the commission may order

(a) that all or part of the costs and expenses of the commission in making the appraisal must be paid by the public utility, and

(b) that the utility pay an amount as the work of appraisal proceeds.

(4) The certificate of the chair of the commission is conclusive evidence of the amounts payable under subsection (3).

(5) Expenses approved by the commission in connection with an appraisal, including expenses incurred by the public utility whose property is appraised, must be charged by the utility to the cost of operating the property as a current item of expense, and the commission may, by order, authorize or require the utility to amortize this charge over a period and in the manner the commission specifies.

1980-60-62; 1983-10-21.

Depreciation accounts and funds

56. (1) If the commission, after inquiry, considers that it is necessary and reasonable that a depreciation account should be carried by a public utility, the commission may, by order, require the utility to keep an adequate depreciation account under rules and forms of account specified by the commission.

(2) The commission must determine and, by order after a hearing, set proper and adequate rates of depreciation.

(3) The rates must be set so as to provide, in addition to the expense of maintenance, the amounts required to keep the public utility's property in a state of efficiency in accordance with technical and engineering progress in that industry of the utility.

(4) A public utility must adjust its depreciation accounts to conform to the rates fixed by the commission and, if ordered by the commission, must set aside out of earnings whatever money is required and carry it in a depreciation fund.

(5) Without the consent of the commission, the depreciation fund must not be expended other than for replacement, improvement, new construction, extension or addition to the property of the utility.

1980-60-63 (1) to (5); 1983-10-21, 23.

Reserve funds

57. (1) The commission may, by order, require a public utility to create and maintain a reserve fund for any purpose the commission considers proper, and may fix the amount or rate to be charged each year in the accounts of the utility for the purpose of creating the reserve fund.

(2) The commission may order that no reserve fund other than that created and maintained as directed by the commission may be created by a public utility.

1980-60-63 (6) and (7); 1983-10-21, 23.

Commission may order amendment of schedules

58. (1) The commission may,

(a) on its own motion, or

(b) on complaint by a public utility or other interested person that the existing rates in effect and collected or any rates charged or attempted to be charged for service by a public utility are unjust, unreasonable, insufficient, unduly discriminatory or in contravention of this Act, the regulations or any other law,

after a hearing, determine the just, reasonable and sufficient rates to be observed and in force.

(2) If the commission makes a determination under subsection (1), it must, by order, set the rates.

(ADD) May 01/08

(2.1) The commission must set rates for the authority in accordance with

(a) the prescribed requirements, if any, and

(b) the prescribed factors and guidelines, if any.

(ADD) May 01/08

(2.2) A requirement prescribed for the purposes of subsection (2.1) (a) applies despite

(a) any other provision of

(i) this Act, including, for greater certainty, section 58.1, or

(ii) the regulations, except a regulation under section 3, or

(b) any previous decision of the commission.

(ADD) May 01/08

(2.3) Subsections (2.1) (a) and (2.2) are repealed on March 31, 2010.

(ADD) May 01/08

(2.4) Despite subsection (2.3), a requirement prescribed for the purposes of subsection (2.1) (a) that is in effect immediately before March 31, 2010, continues to apply after that date as though subsection (2.2) were still in force, unless the prescribed requirement is amended or repealed after that date.

(3) The public utility affected by an order under this section must

(a) amend its schedules in conformity with the order, and

(b) file amended schedules with the commission.

1980-60-64; 2008-13-10.

(RET) Mar 31/08

Rate rebalancing

58.1 (1) In this section, **"revenue-cost ratio"** means the amount determined by dividing the authority's revenues from a class of customers during a period of time by the authority's costs to serve that class of customers during the same period of time.

(2) This section applies despite

(a) any other provision of

(i) this Act, or

(ii) the regulations, except a regulation under section 3 or 125.1 (4) (f), or

(b) any previous decision of the commission.

(3) The following decision and orders of the commission are of no force or effect to the extent that they require the authority to do anything for the purpose of changing revenue-cost ratios:

(a) 2007 RDA Phase 1 Decision, issued October 26, 2007;

(b) order G-111-07, issued September 7, 2007;

(c) order G-130-07, issued October 26, 2007;

(d) order G-10-08, issued January 21, 2008,

and the rates of the authority that applied immediately before this section comes into force continue to apply and are deemed to be just, reasonable and not unduly discriminatory.

(4) Nothing in subsection (3) prevents the commission from setting rates for the authority, but the commission may not set rates for the authority for the purpose of changing the revenue-cost ratio for a class of customers.

(5) Subsection (4) is repealed on March 31, 2010.

(6) Nothing in subsection (3) prevents the commission from setting rates for the authority, but the commission, after March 31, 2010, may not set rates for the authority such that the revenue-cost ratio, expressed as a percentage, for any class of customers increases by more than 2 percentage points per year compared to the revenue-cost ratio for that class immediately before the increase.

2008-13-11.

Discrimination in rates

59. (1) A public utility must not make, demand or receive

(a) an unjust, unreasonable, unduly discriminatory or unduly preferential rate for a service provided by it in British Columbia, or

(b) a rate that otherwise contravenes this Act, the regulations, orders of the

commission or any other law.

(2) A public utility must not

(a) as to rate or service, subject any person or locality, or a particular description of traffic, to an undue prejudice or disadvantage, or

(b) extend to any person a form of agreement, a rule or a facility or privilege, unless the agreement, rule, facility or privilege is regularly and uniformly extended to all persons under substantially similar circumstances and conditions for service of the same description.

(3) The commission may, by regulation, declare the circumstances and conditions that are substantially similar for the purpose of subsection (2) (b).

(4) It is a question of fact, of which the commission is the sole judge,

(a) whether a rate is unjust or unreasonable,

(b) whether, in any case, there is undue discrimination, preference, prejudice or disadvantage in respect of a rate or service, or

(c) whether a service is offered or provided under substantially similar circumstances and conditions.

(5) In this section, a rate is "unjust" or "unreasonable" if the rate is

(a) more than a fair and reasonable charge for service of the nature and quality provided by the utility,

(b) insufficient to yield a fair and reasonable compensation for the service provided by the utility, or a fair and reasonable return on the appraised value of its property, or

(c) unjust and unreasonable for any other reason.

1980-60-65; 1983-10-21.

Setting of rates

(AM) Dec 01/07

60. (1) In setting a rate under this Act

(a) the commission must consider all matters that it considers proper and relevant affecting the rate,

(SUB) May 29/03

(b) the commission must have due regard to the setting of a rate that

(i) is not unjust or unreasonable within the meaning of section 59,

(ii) provides to the public utility for which the rate is set a fair and reasonable return on any expenditure made by it to reduce energy demands, and

(iii) encourages public utilities to increase efficiency, reduce costs and enhance performance,

(ADD) May 29/03

(b.1) the commission may use any mechanism, formula or other method of setting the rate that it considers advisable, and may order that the rate derived from such a mechanism, formula or other method is to remain in effect for a specified period, and

(c) if the public utility provides more than one class of service, the commission must

(i) segregate the various kinds of service into distinct classes of service,

(ii) in setting a rate to be charged for the particular service provided, consider each distinct class of service as a self contained unit, and

(iii)

set a rate for each unit that it considers to be just and reasonable for that unit, without regard to the rates fixed for any other unit.

(AM) Dec 01/07

(2) In setting a rate under this Act, the commission may take into account a distinct or special area served by a public utility with a view to ensuring, so far as the commission considers it advisable, that the rate applicable in each area is adequate to yield a fair and reasonable return on the appraised value of the plant or system of the public utility used, or prudently and reasonably acquired, for the purpose of providing the service in that special area.

(3) If the commission takes a special area into account under subsection (2), it must have regard to the special considerations applicable to an area that is sparsely settled or has other distinctive characteristics.

(4) For this section, the commission must exclude from the appraised value of the property of the public utility any franchise, licence, permit or concession obtained or held by the utility from a municipal or other public authority beyond the money, if any, paid to the municipality or public authority as consideration for that franchise, licence, permit or concession, together with necessary and reasonable expenses in procuring the franchise, licence, permit or concession.

1980-60-66; 2003-46-7; 2007-14-213, 215 (B.C. Reg. 354/2007).

Rate schedules to be filed with commission

61. (1) A public utility must file with the commission, under rules the commission specifies and within the time and in the form required by the commission, schedules showing all rates established by it and collected, charged or enforced or to be collected or enforced.

(AM) May 01/08

(2) A schedule filed under subsection (1) must not be rescinded or amended without the commission's consent.

(3) The rates in schedules as filed and as amended in accordance with this Act and the regulations are the only lawful, enforceable and collectable rates of the public utility filing them, and no other rate may be collected, charged or enforced.

(4) A public utility may file with the commission a new schedule of rates that the utility considers to be made necessary by a rise in the price, over which the utility has no effective control, required to be paid by the public utility for its gas supplies, other energy supplied to it, or expenses and taxes, and the new schedule may be put into effect by the public utility on receiving the approval of the commission.

(5) Within 60 days after the date it approves a new schedule under subsection (4), the commission may,

(a) on complaint of a person whose interests are affected, or

(b) on its own motion,

direct an inquiry into the new schedule of rates having regard to the fixing of a rate that is not unjust or unreasonable.

(6) After an inquiry under subsection (5), the commission may

(a) rescind or vary the increase and order a refund or customer credit by the utility of all or part of the money received by way of increase, or

(b) confirm the increase or part of it.

1980-60-67; 1983-10-21; 2008-13-12.

Schedules must be available to public

62. A public utility must keep a copy of the schedules filed open to and available for public inspection under commission rules.

1980-60-68.

Schedules must be observed

(AM) Dec 01/07

63. A public utility must not, without the consent of the commission, directly or indirectly, in any way charge, demand, collect or receive from any person for a regulated service provided by it, or to be provided by it, compensation that is greater than, less than or other than that specified in the subsisting schedules of the utility applicable to that service and filed under this Act.

1980-60-69; 1983-10-21; 2007-14-212 (B.C. Reg. 354/2007).

Orders respecting contracts

64. (1) If the commission, after a hearing, finds that under a contract entered into by a public utility a person receives a regulated service at rates that are unduly preferential or discriminatory, the commission may

(a) declare the contract unenforceable, either wholly or to the extent the commission considers proper, and the contract is then unenforceable to the extent specified, or

(b) make any other order it considers advisable in the circumstances.

(2) If a contract is declared unenforceable either wholly or in part, the commission may order that rights accrued before the date of the order be preserved, and those rights may then be enforced as fully as if no proceedings had been taken under this section.

1980-60-70.

PART 3.1 – Energy Security and the Environment

(ADD) May 01/08

Electricity self-sufficiency

64.01 (1) The authority must

(a) by the 2016 calendar year, achieve electricity self-sufficiency according to the prescribed criteria, and

(b) maintain, according to the prescribed criteria, electricity self-sufficiency in each calendar year after achieving it.

(2) A public utility, in planning for

(a) the construction or extension of generation facilities, and

(b) energy purchases,

must consider the government's goal that British Columbia be electricity self-sufficient by the 2016 calendar year and maintain self-sufficiency after that year.

2008-13-13.

(ADD) May 01/08

Clean and renewable resources

64.02 (1) To facilitate the achievement of the government's goal that at least 90% of the electricity generated in British Columbia be generated from clean or renewable resources, a person to whom this section applies

(a) must pursue actions to meet the prescribed targets in relation to clean or

renewable resources, and

(b) must use the prescribed guidelines in planning for

(i) the construction or extension of generation facilities, and

(ii) energy purchases.

(2) This section applies to

(a) the authority, and

(b) a prescribed public utility, if any, and a public utility in a class of prescribed public utilities, if any.

2008-13-13.

(ADD)**Standing offer**
May
01/08

64.03 (1) In this section, **"eligible facility"** means a generation facility that

(a) either

(i) has only one generator with a nameplate capacity of 10 megawatts or less or has more than one generator and the total nameplate capacity of all of them is 10 megawatts or less, or

(ii) meets the prescribed requirements, and

(b) either

(i) is a high-efficiency cogeneration facility, or

(ii) generates energy by means of a prescribed technology or from clean or renewable resources,

but does not include a prescribed generation facility or class of generation facilities.

(2) The authority must establish and maintain a standing offer

(a) during the times prescribed by and in accordance with the regulations, if any, and

(b) on the terms and conditions, if any, approved by the commission under subsection (3),

to enter into an energy supply contract for the purchase of electricity from eligible facilities.

(3) Subject to regulations made for the purposes of subsection (2) (a), the commission, by order and on application by the authority, may approve terms and conditions for the purposes of subsection (2) (b) if the commission considers that the terms and conditions are in the public interest.

(4) The commission may not issue an order under section 71 (3) with respect to a contract entered into in accordance with the regulations made for the purposes of subsection (2) (a), and exclusively on the terms and conditions referred to in subsection (2) (b), of this section.

2008-13-13.

(ADD)**Smart meters**
May
01/08

64.04 (1) In this section:

"private dwelling" means

(a) a structure that is occupied as a private residence, or

(b) if only part of a structure is occupied as a private residence, that part of the structure;

"smart meter" means a meter that meets the prescribed requirements, and includes related components, equipment and metering and communication infrastructure that meet the prescribed requirements.

(2) Subject to subsection (3), the authority must install and put into operation smart meters in accordance with and to the extent required by the regulations.

(3) The authority must complete all obligations imposed under subsection (2) by the end of the 2012 calendar year.

(4) If a public utility, other than the authority, makes an application under the Act in relation to advanced meters, the commission, in considering that application, must consider the government's goal of having advanced meters and associated infrastructure in use with respect to customers other than those of the authority.

(5) The authority may, by itself, or by its engineers, surveyors, agents, contractors, subcontractors or employees, enter on any land, other than a private dwelling, without the consent of the owner, for a purpose relating to the use, maintenance, safeguarding, installation, replacement, repair, inspection, calibration or reading of its meters, including smart meters.

2008-13-13.

PART 4 – Carriers, Purchasers and Processors

Definition

(ADD) May 29/03 **64.1** In this Part, **"sufficient notice"** means notice in the manner and form, within the period, with the content and by the person required by the commission.

2003-46-8.

Common carrier

(SUB) May 29/03 **65.** (1) In this section, **"common carrier"** means a person declared to be a common carrier by the commission under subsection (2) (a).

(2) On application by an interested person and after a hearing, sufficient notice of which has been given to all persons the commission believes may be affected, the commission may

(a) issue an order, to be effective on a date determined by it, declaring a person who owns or operates a pipeline for the transportation of

(i) one or more of crude oil, natural gas and natural gas liquids, or

(ii) any other type of energy resource prescribed by the Lieutenant Governor in Council,

to be a common carrier with respect to the operation of the pipeline, and

(b) in the order establish the conditions under which the common carrier must accept and carry energy resources.

(3) On application by a person that uses or seeks to use facilities operated by a common carrier, the commission, by order and after a hearing, sufficient notice of which has been given to all persons the commission believes may be affected, may establish the conditions under which the common carrier must accept and carry crude oil, natural gas, natural gas liquids or prescribed energy resources referred to in subsection (2) (a).

(4) A common carrier must not unreasonably discriminate

(a) between itself and persons who apply to the common carrier to transport, in its pipeline, crude oil, natural gas, natural gas liquids or prescribed energy resources referred to in subsection (2) (a) (ii), or

(b) among the persons who so apply.

(5) A common carrier must comply with the conditions in any order applicable to the common carrier that is made under this section.

(6) The commission may, by order and after a hearing, sufficient notice of which has been given to all persons the commission believes may be affected, vary an order made under this section.

(7) If an agreement between a common carrier and another person
(a) is made before an order is made under this section, and
(b) is inconsistent with the conditions established by the commission in an order made under this section,
the commission may, in the order or in a subsequent order, after a hearing, sufficient notice of which has been given to all persons the commission believes may be affected, vary the agreement between the parties to eliminate the inconsistency.

(8) Subject to subsection (9), if an agreement is varied under subsection (7), the common carrier and the commission are not liable for damages suffered as a result of that variation by the other party to the agreement.

(9) Subsection (8) does not apply to a common carrier referred to in that subsection in relation to anything done or omitted by that person in bad faith.

2003-46-8.

Common purchaser

(SUB) May 29/03

66. (1) In this section, **"common purchaser"** means a person declared to be a common purchaser by the commission under subsection (2).

(2) On application by an interested person and after a hearing, sufficient notice of which has been given to persons the commission believes may be affected, the commission may issue an order, to be effective on a date determined by it, declaring a person who purchases or otherwise acquires, from a pool designated by the commission, crude oil, natural gas or natural gas liquids to be a common purchaser of the crude oil, natural gas or natural gas liquids.

(3) On application by a person whose crude oil, natural gas or natural gas liquids is or will be purchased by a common purchaser, the commission, by order and after a hearing, sufficient notice of which has been given to all persons the commission believes may be affected, may establish the conditions under which the common purchaser must purchase crude oil, natural gas or natural gas liquid.

(4) A common purchaser must not unreasonably discriminate
(a) between itself and persons who apply for the services offered by the common purchaser, or
(b) among the persons who so apply.

(5) A common purchaser must comply with the conditions in any order applicable to the common purchaser that is made under this section.

(6) The commission may, by order and after a hearing, sufficient notice of which has been given to all persons the commission believes may be affected, vary an order made under this section.

(7) If an agreement between a common purchaser and another person
(a) is made before an order is made under this section, and
(b) is inconsistent with the conditions established by the commission in an order made under this section,
the commission may, in the order or in a subsequent order, after a hearing, sufficient notice of which has been given to all persons the commission believes may be affected, vary the agreement between the parties to eliminate the inconsistency.

(8) Subject to subsection (9), if an agreement is varied under subsection (7), the common purchaser and the commission are not liable for damages suffered as a result of that variation by the other party to the agreement.

(9) Subsection (8) does not apply to a common purchaser referred to in that subsection in relation to anything done or omitted by that person in bad faith.

2003-46-8.

Common processor

(SUB) May 29/03 **67.** (1) In this section, **"common processor"** means a person declared to be a common processor by the commission under subsection (2).

(2) On application by an interested person and after a hearing, sufficient notice of which has been given to all persons the commission believes may be affected, the commission may issue an order, to be effective on a date determined by it, declaring the person that owns or operates a plant for processing natural gas to be a common processor of natural gas.

(3) On application by a person that uses or seeks to use facilities operated by a common processor, the commission, by order and after a hearing, sufficient notice of which has been given to all persons the commission believes may be affected, may establish the conditions under which the common processor must accept and process natural gas.

(4) A common processor must not unreasonably discriminate

(a) between itself and persons who apply for the services offered by the common processor, or

(b) among the persons who so apply.

(5) A common processor must comply with the conditions in any order applicable to the common processor made under this section.

(6) The commission may, by order and after a hearing, sufficient notice of which has been given to all persons the commission believes may be affected, vary an order made under this section.

(7) If an agreement between a common processor and another person

(a) is made before an order is made under this section, and

(b) is inconsistent with the conditions established by the commission in an order made under this section,

the commission may, in the order or a subsequent order, after a hearing, sufficient notice of which has been given to all persons the commission believes may be affected, vary the agreement between the parties to eliminate the inconsistency.

(8) Subject to subsection (9), if an agreement is varied under subsection (7), the common processor and the commission are not liable for damages suffered as a result of that variation by the other party to the agreement.

(9) Subsection (8) does not apply to a common processor referred to in that subsection in relation to anything done or omitted by that person in bad faith.

2003-46-8.

PART 5 – Electricity Transmission

Definitions

(REP) May 29/03 **68.** In this Part:

"electricity transmission facilities" means conductors, circuits, transmission towers, substations, switching stations, transformers and any other equipment or facilities that

are necessary for the purpose of transmitting electricity;

"energy" means electricity or natural gas;

(SUB) May 29/03 **"energy supply contract"** means a contract under which energy is sold by a seller to a public utility or another buyer, and includes an amendment of that contract, but does not include a contract in respect of which a schedule is approved under section 61 of this Act;

(ADD) May 29/03 **"gas marketer"** means a person who holds a gas marketer licence issued under section 71.1 (6) (a);

(ADD) May 29/03 **"low-volume consumer"** has the meaning ascribed to it under rules made by the commission under section 71.1 (10);

"natural gas" means any methane, propane or butane that is sold for consumption as a domestic, commercial or industrial fuel or as an industrial raw material;

"public utility" means a public utility to which Part 3 applies;

"seller" means a person who sells or trades in energy.

1980-60-84.1; 1988-63-5; 2003-46-9.

Repealed

(REP) May 29/03 **69.** *Repealed.* [2003-46-10]

Use of electricity transmission facilities

70. (1) On application and after a hearing, the commission may make an order directing a public utility to allow a person, other than a public utility, to use the electricity transmission facilities of the public utility if the commission finds that

(a) the person and the public utility have failed to agree on the use of the facilities or on the conditions or compensation for their use,

(b) the use of the facilities will not prevent the public utility or other users from performing their duties or result in any substantial detriment to their service, and

(c) the public interest requires the use of the facilities by the person.

(2) An order under subsection (1) may contain terms and conditions the commission considers advisable, including terms and conditions respecting the rates payable to the public utility for the use of its electricity transmission facilities.

(3) After a hearing, the commission may, by order, vary or rescind an order made under this section.

(4) Any interested person may apply to the commission for an order under this section, and the application must contain the information the commission specifies.

1980-60-85.2; 1988-63-7.

Energy supply contracts

(AM) May 29/03 **71.** (1) Subject to subsection (1.1), a person who, after this section comes into force, enters into an energy supply contract must

(a) file a copy of the contract with the commission under rules and within the time it specifies, and

(b) provide to the commission any information it considers necessary to determine whether the contract is in the public interest.

(ADD) May 29/03 (1.1) Subsection (1) does not apply to an energy supply contract for the sale of natural gas unless the sale is to a public utility.

(SUB) May 01/08

(2) The commission may make an order under subsection (3) if the commission, after a hearing, determines that an energy supply contract to which subsection (1) applies is not in the public interest.

(ADD) May 01/08

(2.1) In determining under subsection (2) whether an energy supply contract is in the public interest, the commission must consider

(a) the government's energy objectives,

(b) the most recent long-term resource plan filed by the public utility under section 44.1, if any,

(c) whether the energy supply contract is consistent with requirements imposed under section 64.01 or 64.02, if applicable,

(d) the interests of persons in British Columbia who receive or may receive service from the public utility,

(e) the quantity of the energy to be supplied under the contract,

(f) the availability of supplies of the energy referred to in paragraph (e),

(g) the price and availability of any other form of energy that could be used instead of the energy referred to in paragraph (e), and

(h) in the case only of an energy supply contract that is entered into by a public utility, the price of the energy referred to in paragraph (e).

(ADD) May 01/08

(2.2) Subsection (2.1) (a) to (c) does not apply if the commission considers that the matters addressed in the energy supply contract filed under subsection (1) were determined to be in the public interest in the course of considering a long-term resource plan under section 44.1.

(ADD) May 01/08

(2.3) A public utility may submit to the commission a proposed energy supply contract setting out the terms and conditions of the contract and a process the public utility intends to use to acquire power from other persons in accordance with those terms and conditions.

(ADD) May 01/08

(2.4) If satisfied that it is in the public interest to do so, the commission, by order, may approve a proposed contract submitted under subsection (2.3) and a process referred to in that subsection.

(ADD) May 01/08

(2.5) In considering the public interest under subsection (2.4), the commission must consider

(a) the government's energy objectives,

(b) the most recent long-term resource plan filed by the public utility under section 44.1,

(c) whether the application for the proposed contract is consistent with the requirements imposed on the public utility under sections 64.01 and 64.02, if applicable, and

(d) the interests of persons in British Columbia who receive or may receive service from the public utility.

(ADD) May 01/08

(2.6) If the commission issues an order under subsection (2.4), the commission may not issue an order under subsection (3) with respect to a contract

(a) entered into exclusively on the terms and conditions, and

(b) as a result of the process

referred to in subsection (2.3).

(3) If subsection (2) applies, the commission may

(a) by order, declare the contract unenforceable, either wholly or to the extent the commission considers proper, and the contract is then unenforceable to the extent specified, or

(b) make any other order it considers advisable in the circumstances.

(4) If an energy supply contract is, under subsection (3) (a), declared unenforceable either wholly or in part, the commission may order that rights accrued before the date of the order under that subsection be preserved, and those rights may then be enforced as fully as if no proceedings had been taken under this section.

(5) An energy supply contract or other information filed with the commission under this section must be made available to the public unless the commission considers that disclosure is not in the public interest.

1980-60-85.3; 1988-63-7; 1989-45-13; 2003-46-11; 2008-13-14.

Gas marketers

(ADD) May 29/03

71.1 (1) A person must not perform a gas marketing activity within the meaning of subsection (2) unless

(a) the person is a public utility and the public utility performs the gas marketing activity within any area in which it is authorized to provide service, or

(b) the person holds a gas marketer licence issued to the person under subsection (6) (a).

(2) For the purposes of subsection (1), a person performs a gas marketing activity if the person

(a) sells or offers to sell natural gas to a low-volume consumer,

(b) acts as the agent or broker for a seller in a sale of natural gas to a low-volume consumer, or

(c) acts or offers to act as the agent or broker of a low-volume consumer in a purchase of natural gas.

(3) A gas marketer must comply with the commission rules issued under subsection (10) and the terms and conditions, if any, attached to the gas marketer licence held by the gas marketer.

(4) A gas marketer must not carry on or offer to carry on business as a gas marketer in a name other than the name in which it is licensed unless authorized to do so in the licence.

(5) If a person is not in compliance with subsection (1), (3) or (4), the commission may do one or more of

(a) declare an energy supply contract between the person and a low-volume consumer unenforceable, either wholly or to the extent the commission considers proper, in which event the contract is enforceable to the extent specified, and

(b) if the person is a gas marketer,

(i) amend the terms and conditions of, or impose new terms and conditions on, the gas marketer licence, and

(ii) suspend or cancel the gas marketer licence.

(6) The commission may

(a) on application, issue a gas marketer licence to any person who is not a public utility,

(b) impose, in respect of any gas marketer licence issued by the commission, terms and conditions that the commission considers appropriate,

(c) amend any of the terms and conditions imposed in respect of a gas marketer licence, and

(d) suspend or cancel a gas marketer licence.

(7) The commission may require, as a condition of granting a gas marketer licence, that the gas marketer post security in a form, and in accordance with such terms and conditions, as the commission considers appropriate.

(8) The commission may order that some or all of the security posted by a gas marketer in accordance with a requirement imposed under subsection (7) be paid out to those persons who the commission considers have been or may be affected by an act or omission of the gas marketer.

(9) Section 43 applies to each gas marketer as if that gas marketer were a public utility.

(10) The commission may make the following rules:

(a) defining "low-volume consumer";

(b) respecting the process by which application may be made for a gas marketer licence and specifying the form and content of applications for that licence;

(c) respecting the imposition of terms and conditions on gas marketer licences;

(d) requiring an applicant for a gas marketer licence to obtain a bond, letter of credit or other specified security and requiring the filing with the commission of proof, satisfactory to the commission, of that security;

(e) respecting the form and content of security that may be required under paragraph (d) and the person by whom and the terms on which it is to be held;

(f) respecting the circumstances in which and the persons to whom disbursement of some or all of the security required under paragraph (d) is to be made.

2003-46-12.

PART 6 – Commission Jurisdiction

Jurisdiction of commission to deal with applications

72. (1) The commission has jurisdiction to inquire into, hear and determine an application by or on behalf of any party interested, complaining that a person constructing, maintaining, operating or controlling a public utility service or charged with a duty or power relating to that service, has done, is doing or has failed to do anything required by this Act or another general or special Act, or by a regulation, order, bylaw or direction made under any of them.

(2) The commission has jurisdiction to inquire into, hear and determine an application by or on behalf of any party interested, requesting the commission to

(a) give a direction or approval which by law it may give, or

(b) approve, prohibit or require anything to which by any general or special Act, the commission's jurisdiction extends.

1980-60-86, 87.

Mandatory and restraining orders

73. (1) The commission may order and require a person to do immediately or by a specified time and in the way ordered, so far as is not inconsistent with this Act, the regulations or another Act, anything that the person is or may be required or authorized to do under this Act or any other general or special Act and to which the commission's jurisdiction extends.

(2) The commission may forbid and restrain the doing or continuing of anything contrary to or which may be forbidden or restrained under any Act, general or special, to which the commission's jurisdiction extends.

1980-60-88.

Inspections and depositions

(SUB) Oct 15/04 **74.** For the purposes of this Act, the commission may

(a) enter on and inspect property, and

(b) require the taking of depositions inside or outside of British Columbia.

2004-45-167.

Commission not bound by precedent

(AM) Oct 15/04 **75.** The commission must make its decision on the merits and justice of the case, and is not bound to follow its own decisions.

1980-60-90; 2004-45-168.

Jurisdiction as to liquidators and receivers

76. (1) The fact that a liquidator, receiver, manager or other official of a public utility, or other person engaged in the petroleum industry, or a person seizing a public utility's property has been appointed by a court in British Columbia, or is acting under the authority of a court, does not prevent the exercise by the commission of any jurisdiction conferred by this Act.

(2) A liquidator, receiver, manager, official or person seizing must act in accordance with this Act and the orders and directions of the commission, whether the orders are general or particular.

(3) The liquidator or other person referred to in subsection (1), and any person acting under that person, must obey the orders of the commission, within its jurisdiction, and the commission may enforce its orders against the person even though the person is appointed by or acts under the authority of a court.

1980-60-91.

Power to extend time

77. If a work, act, matter or thing is, by order or decision of the commission, required to be performed or completed within a specified time, the commission may, if the circumstances of the case in its opinion so require, extend the time so specified

(a) on notice and hearing, or

(b) in its discretion, on application, without notice to any person.

1980-60-92.

Evidence

(REP) Oct 15/04 **78.** (1) *Repealed.* [2004-45-169]

(2) An inquiry that the commission considers necessary may be made by a member or officer or by a person appointed by the commission to make the inquiry, and the commission may act on that person's report.

(AM) Oct 15/04 (3) Each member, officer and person appointed has, for the purpose of the inquiry, the powers conferred on the commission by section 74 of this Act and section 34 (3) and (4) of the *Administrative Tribunals Act*.

(4) If a person is appointed to inquire and report on a matter, the commission may order by whom, and in what proportion, the costs incurred must be paid, and may

set the amount of the costs.

1980-60-93; 2004-45-169.

Findings of fact conclusive

79. The determination of the commission on a question of fact in its jurisdiction, or whether a person is or is not a party interested within the meaning of this Act, is binding and conclusive on all persons and all courts.

1980-60-94.

Commission not bound by judicial acts

80. In determining a question of fact, the commission is not bound by the finding or order of a court in a proceeding involving the determination of that fact, and the finding or order is, before the commission, evidence only.

1980-60-95.

Pending litigation

81. The fact that a suit, prosecution or other proceeding in a court involving questions of fact is pending does not deprive the commission of jurisdiction to hear and determine the same questions of fact.

1980-60-96.

Power to inquire without application

82. (1) The commission

(a) may, on its own motion, and

(b) must, on the request of the Lieutenant Governor in Council,

inquire into, hear and determine a matter that under this Act it may inquire into, hear or determine on application or complaint.

(2) For the purpose of subsection (1), the commission has the same powers as are vested in it by this Act in respect of an application or complaint.

1980-60-97.

Action on complaints

83. If a complaint is made to the commission, the commission has powers to determine whether a hearing or inquiry is to be had, and generally whether any action on its part is or is not to be taken.

1980-60-98.

General powers not limited

84. The enumeration in this Act of a specific commission power or authority does not exclude or limit other powers or authorities given to the commission.

1980-60-99.

Hearings to be held in certain cases

85. (1) Except in case of urgency, of which the commission is sole judge, the commission must not, without a hearing, make an order involving an outlay, loss or deprivation to a public utility.

(2) If an order is made in case of urgency without a hearing, on the application of a person interested, the commission must as soon as practicable hear and reconsider the matter and make any further order it considers advisable.

1980-60-100; 1982-54-24.

Public hearing

86. If this Act requires that a hearing be held, it must be a public hearing whenever, in the opinion of the commission or the Lieutenant Governor in Council, a public hearing is in the public interest.

1980-60-101.

Repealed

(REP) Oct 15/04

86.1 *Repealed.* [2004-45-170]

When oral hearings not required

(ADD) May 29/03

86.2 (1) Despite any other provision of this Act, in any circumstance in which, under this Act, a hearing may or must be held, the commission may conduct a written hearing.

(2) The commission may make rules respecting the circumstances in which and the process by which written hearings may be conducted and specifying the form and content of materials to be provided for written hearings.

2003-46-13.

Recitals not required in orders

87. In making an order, the commission is not required to recite or show on the face of the order the taking of any proceeding, the giving of any notice or the existence of any circumstance necessary to give the commission jurisdiction.

1980-60-102.

Application of orders

88. (1) In making an order, rule or regulation, the commission may make it apply to all cases, or to a particular case or class of cases, or to a particular person.

(AM) May 29/03

(2) The commission may exempt a person from the operation of an order, rule or regulation made under this Act for a time the commission considers advisable.

(AM) May 29/03

(3) The commission may, on conditions it considers advisable, with the advance approval of the Lieutenant Governor in Council, exempt a person, equipment or facilities from the application of all or any of the provisions of this Act or may limit or vary the application of this Act.

(AM) May 01/08

(4) The commission has no power under this section to make an order respecting a person, or a person in respect of a matter, who has been exempted under to section 22.

1980-60-103; 1982-54-25; 2003-46-14; 2008-13-15.

Withdrawal of application

88.1

(ADD)
Oct
15/04

If an applicant withdraws all or part of an application or the parties advise the commission that they have reached a settlement of all or part of an application, the commission may order that the application or part of it is dismissed.

2004-45-171.

Partial relief

89. On an application under this Act, the commission may make an order granting the whole or part of the relief applied for or may grant further or other relief, as the commission considers advisable.

1980-60-104.

Commencement of orders

90. (1) In an order or regulation, the commission may direct that the order or regulation or part of it comes into operation

(a) at a future time,

(b) on the happening of an event specified in the order or regulation, or

(c) on the performance, to the satisfaction of the commission, by a person named by it of a term imposed by the order.

(2) The commission may, in the first instance, make an interim order, and reserve further direction for an adjourned hearing or further application.

1980-60-105.

Orders without notice

91. (1) If the special circumstance of a case so requires, the commission may, without notice, make an interim order authorizing, requiring or forbidding anything to be done that the commission is empowered to authorize, require or forbid on application, notice or hearing.

(2) The commission must not make an interim order under subsection (1) for a longer time than it considers necessary for a hearing and decision.

(3) A person interested may, before final decision, apply to modify or set aside an interim order made without notice.

1980-60-106.

Directions

92. If, in the exercise of a commission power under an Act, the commission directs that a structure, appliance, equipment or works be provided, constructed, reconstructed, removed, altered, installed, operated, used or maintained, the commission may, except as otherwise provided in the Act conferring the power, order

(a) by what person interested at or within what time,

(b) at whose cost and expense,

(c) on what terms including payment of compensation, and

(d) under what supervision,

the structure, appliance, equipment or works must be carried out.

1980-60-107.

Repealed

(REP) Oct 15/04 **93.** *Repealed.* [2004-45-170]

Repealed

(REP) Oct 15/04 **94.** *Repealed.* [2004-45-170]

Lien on land

95. (1) If the commission makes an order for payment of money, costs or a penalty, the commission may register a copy of the order certified by the commission's secretary in a land title office.

(2) On registration in a land title office, an order is a lien and charge on all the land of the person ordered to make the payment that is in the land title district in which the order is registered, to the same extent and with the same effect and realizable in the same way as a judgment of the Supreme Court under the *Court Order Enforcement Act*.

1980-60-110.

Substitute to carry out orders

96. (1) If a person defaults in doing anything directed by an order of the commission under this Act,

(a) the commission may authorize a person it considers suitable to do the thing, and

(b) the person authorized may do the thing authorized and may recover from the person in default the expense incurred in doing the thing, as money paid for and at the request of that person.

(2) The certificate of the commission of the amount expended is conclusive evidence of the amount of the expense.

1980-60-111.

Entry, seizure and management

97. (1) The commission may take the steps and employ the persons it considers necessary to enforce an order made by it, and, for that purpose, may forcibly or otherwise enter on, seize and take possession of the whole or part of the business and the property of a public utility affected by the order, together with the records, offices and facilities of the utility.

(2) The commission may, until the order has been enforced or until the Lieutenant Governor in Council otherwise orders, assume, take over and continue the management of the business and property of the utility in the interest of its shareholders, creditors and the public.

(3) While the commission continues to manage or direct the management of the utility, the commission may exercise, for the business and property, the powers, duties, rights and functions of the directors, officers or managers of the utility in all respects, including the employment and dismissal of officers or employees and the employment of others.

(4) On the commission taking possession of the business and property of the utility, each officer and employee of the utility must obey the lawful orders and instructions of the commission for that business and property, and of any person placed by the commission in authority in the management of the utility or a department of its undertaking or service.

(5) On taking possession of the business and property of a public utility, the commission may determine, receive or pay out all money due to or owing by the utility, and give cheques and receipts for money to the same extent and to the same effect as the utility or its officers or employees could do.

(6) The costs incurred by the commission under this section are in the discretion of the commission, and the commission may order by whom and in what amount or proportion costs are to be paid.

1980-60-112.

Defaulting utility may be dissolved

98. (1) If a public utility incorporated under an Act of the Legislature fails to comply with a commission order, and the commission believes that no effective means exist to compel the utility to comply, the commission, in its discretion, may transmit to the Attorney General a certificate, signed by its chair and secretary, setting out the nature of the order and the default of the public utility.

(2) Ten days after publication in the Gazette of a notice of receipt of the certificate by the Attorney General, the Lieutenant Governor in Council may, by order, dissolve the public utility.

1980-60-113.

PART 7 – Decisions and Appeals

Reconsideration by commission

99. The commission may reconsider, vary or rescind a decision, order, rule or regulation made by it, and may rehear an application before deciding it.

1980-60-114 (1).

Requirement for hearing

100. If a hearing is held or required under this Act before a rule or regulation is made, the rule or regulation must not be altered, suspended or revoked without a hearing.

1980-60-114 (2).

Appeal to Court of Appeal

101. (1) An appeal lies from a decision or order of the commission to the Court of Appeal with leave of a justice of that court.

(2) The party appealing must give notice of the application for leave to appeal, stating the grounds of appeal, to the commission, to the Attorney General and to any party adverse in interest, at least 2 clear days before the hearing of the application.

(3) If leave is granted, within 15 days from the granting, the appellant must give notice of appeal to the commission, to the Attorney General, and to any party

adverse in interest.

(4) The commission and the Attorney General may be heard by counsel on the appeal.

(5) On the determination of the questions involved in the appeal, the Court of Appeal must certify its opinion to the commission, and an order of the commission must conform to that opinion.

1980-60-115 to 117, 121; 1982-7-107.

No automatic stay of proceedings while matter appealed

102. (1) An appeal to the Court of Appeal does not of itself stay or suspend the operation of the decision, order, rule or regulation appealed from, but the Court of Appeal may grant a suspension, in whole or in part, until the appeal is decided, on the terms the court considers advisable.

(2) The commission may, in its discretion, suspend the operation of its decision, order, rule or regulation from which an appeal is taken until the decision of the Court of Appeal is given.

1980-60-119.

Costs of appeal

103. (1) Payment of the costs incurred for an application or appeal to the Court of Appeal may be enforced in the same way as payment of costs ordered by the commission.

(2) Neither the commission nor an officer, employee or agent of the commission is liable for costs in respect of an application or appeal referred to in subsection (1).

1980-60-118.

Case stated by commission

104. (1) The commission may, on its own motion or on the application of a party who gives the security the commission directs, and must, on the request of the Attorney General, state a case in writing for the opinion of the Court of Appeal on a question that, in the opinion of the commission or of the Attorney General, is a question of law.

(2) The Court of Appeal must hear and determine all questions of law arising on the stated case and must remit the matter to the commission with the court's opinion.

(3) The court's opinion is binding on the commission and on all parties.

1980-60-122.

Jurisdiction of commission exclusive

105. (1) The commission has exclusive jurisdiction in all cases and for all matters in which jurisdiction is conferred on it by this or any other Act.

(2) Unless otherwise provided in this Act, an order, decision or proceeding of the commission must not be questioned, reviewed or restrained by or on an application for judicial review or other process or proceeding in any court.

1980-60-123.

PART 8 – Offences and Penalties

Offences

106. (1) The following persons commit an offence:

(a) a person who fails or refuses to obey an order of the commission made under this Act;

(b) a person who does, causes or permits to be done an act, matter or thing contrary to this Act or omits to do an act, matter or thing required to be done by this Act;

(c) a public utility

(i) that fails or refuses to prepare and provide to the commission in the time, manner and form, and with the particulars and verification required under this Act, an information return, the answer to a question submitted by the commission or information required by the commission under this Act,

(ii) that willfully or negligently makes a return or provides information to the commission that is false in any particular,

(iii) that gives, or an officer of which gives, to an officer, agent, manager or employee of the utility a direction, instruction or request to do or refrain from doing an act referred to in paragraph (d) (i) to (vii) and in respect of which the officer, agent, manager or employee is convicted under paragraph (d) (i) to (vii), or

(iv) an officer, agent, manager or employee of which is convicted of an offence under paragraph (d) (viii);

(d) an officer, agent, manager or employee of a public utility

(AM) Dec 01/07 (i) who fails or refuses to complete and provide to the commission a report or form of return required under this Act,

(AM) Dec 01/07 (ii) who fails or refuses to answer a question contained in a report or form of return required under this Act,

(AM) Dec 01/07 (iii) who willfully gives a false answer to a question contained in a report or form of return required under this Act,

(AM) Dec 01/07 (iv) who evades a question or gives an evasive answer to a question contained in a report or form of return required under this Act, if the person has the means to ascertain the facts,

(v) who, after proper demand under this Act, fails or refuses to exhibit to the commission or a person authorized by it an account, record or memorandum of the public utility that is in the person's possession or under the person's control,

(vi) who fails to properly use and keep the system of accounting of the public utility specified by the commission under this Act,

(vii) who refuses to do any act or thing in that system of accounting when directed by the commission or its representative,

(AM) Dec 01/07 (viii) on whom the commission serves notice directing the person to provide to the commission information or a return that the utility may be required to provide under this Act, and who willfully refuses or fails to provide the information or return to the best of the person's knowledge, or means of knowledge, in the manner and time directed by the commission, or

(ix) who knowingly registers or causes to be registered on the books of the public utility any issue or transfer of shares that has been made contrary to section 54 (5), (7) or (8);

(e) the president, and each vice president, director, managing director, superintendent and manager of a public utility that fails or refuses to obey

an order of the commission made under this Act;

(f) the mayor and each councillor or member of the ruling body of a municipality that fails or refuses to obey an order of the commission made under this Act;

(REP) May 29/03

(g) *Repealed.* [2003-46-15]

(AM) Dec 01/07

(h) a person who obstructs or interferes with a commissioner, officer or person in the exercise of rights conferred or duties imposed under this Act;

(i) a person who knowingly solicits, accepts or receives, directly or indirectly, a rebate, concession or discrimination for service of a public utility, if the service is provided or received in violation of this Act;

(j) except so far as the person's public duty requires the person to report on or take official action, an officer or employee of the commission, or person having access to or knowledge of a return made to the commission or of information procured or evidence taken under this Act, other than a public inquiry or public hearing, who, without first obtaining the authority of the commission, publishes or makes known information, having obtained or knowing it to have been derived from the return, information or evidence;

(k) a person who applies to a public utility to register on its books any issue or transfer of shares that has been made contrary to section 54 (5), (7) or (8).

(2) Subsection (1) (e) and (f) does not apply if the person proves

(a) that, according to the person's position and authority, the person took all necessary and proper means in the person's power to obey and carry out, and to procure obedience to and the carrying out of the order, and

(b) that the person was not at fault for the failure or refusal.

(3) Subsection (1) (h) does not apply if the commissioner, officer or person does not, on request at the time, produce a certificate of his or her appointment or authority.

(4) A person convicted of an offence under this section is liable to a penalty not greater than $10 000.

(5) If this Act makes anything an offence, each day the offence continues constitutes a separate offence.

(6) Nothing in or done under this section affects the liability of a public utility otherwise existing or prejudices enforcement of an order of the commission in any way otherwise available.

1980-60-124; 1982-54-26; 1983-10-21; 1993-59-56; 1994-35-104; 2003-46-15; 2007-14-201, 215 (B.C. Reg. 354/2007).

Restraining orders

107. (1) If a person, to or in respect of whom

(REP) May 29/03

(a) *Repealed.* [2003-46-16]

(b) a certificate of public convenience and necessity,

(c) an order under section 22, 53 or 54 (10), or

(d) an approval given under section 50 or 54 (5), (7) or (8),

is issued, contravenes a condition or requirement of the certificate, order or approval, the contravention may be restrained in a proceeding brought by the minister in the Supreme Court.

(REP) May 29/03

(2) *Repealed.* [2003-46-16]

1980-60-124.1; 1982-54-27; 1994-35-105; 2003-46-16.

Revocation of certificates

(AM) May 29/03 **108.** If a person contravenes a condition or requirement of an order made under section 22,

(a) the Lieutenant Governor in Council may revoke

(AM) May 29/03 (i) the energy project certificate or energy operation certificate in respect of which the contravention occurred, and

(ii) any approval, licence or permit given or issued, in association with the certificate, or

(AM) May 01/08 (b) the minister responsible for the administration of the *Hydro and Power Authority Act* may revoke the order.

1980-60-124.2; 1982-54-27; 1994-35-106; 2003-46-17; 2008-13-16.

Remedies not mutually exclusive

109. If a person contravenes

(REP) May 29/03 (a) *Repealed.* [2003-46-18]

(b) a condition or requirement of an order made under section 22, 53 or 54 (10),

(c) the conditions of an approval given under section 50 or 54 (5), (7) or (8), or

(d) a condition or requirement of a certificate of public convenience and necessity,

the penalties for the contravention provided for in section 106, the remedies for the contravention provided for in section 107 and, if applicable, the remedies provided for in section 108 are not mutually exclusive, and any or all of them may be applied in the one case.

1980-60-124.3; 1982-54-27; 1994-35-107; 2003-46-18.

PART 9 – General

Powers of commission in relation to other Acts

(AM) May 29/03 **110.** The powers given to the commission by this Act apply

(a) even though the subject matter about which the powers are exercisable is the subject matter of an agreement or another Act,

(b) in respect of service and rates, whether fixed by or the subject of an agreement or other Act, or otherwise, and

(c) if the service or rates are governed by an agreement, whether the agreement is incorporated in, or ratified, or made binding by a general or special Act, or otherwise.

1980-60-125; 1985-49-10; 1989-45-14; 2003-46-19.

Substantial compliance

111. Substantial compliance with this Act is sufficient to give effect to the orders, rules, regulations and acts of the commission, and they must not be declared inoperative, illegal or void for want of form or an error or omission of a technical or clerical nature.

1980-60-126.

Vicarious liability

112. In construing and enforcing this Act, or a rule, regulation, order or direction of the commission, an act, omission or failure of an officer, agent or other person acting for or employed by a public utility, if within the scope of the person's employment, is deemed in every case to be the act, omission or failure of the utility.

1980-60-127.

Public utilities may apply

113. A person who is subject to regulation under this Act may make application or complaint to the commission about a matter affecting a public utility, as if made by another party interested.

1980-60-128.

Municipalities may apply

114. (1) In this section, **"municipality"** includes a regional district.

(2) If a municipality believes that the interests of the public in the municipality or a part of it are sufficiently concerned, the municipality may, by resolution, become an applicant, complainant or intervenant in a matter within the commission's jurisdiction.

(3) The municipality may, for subsection (2), take a proceeding or incur expense necessary

(a) to submit the matter to the commission,

(b) to oppose an application or complaint before the commission, or

(c) if necessary, to become a party to a proceeding or appeal under this Act.

1980-60-129; 1981-21-117.

Certified documents as evidence

115. (1) A copy of a rule, regulation, order or other document in the commission secretary's custody, purporting to be certified by the secretary to be a true copy, is evidence of the document without proof of the signature.

(2) A certificate purporting to be signed by the commission secretary stating that no rule, regulation or order on a specified matter has been made by the commission, is evidence of the fact stated without proof of the signature.

1980-60-130, 131.

Class representation

116. (1) With the approval of the Attorney General, the commission may appoint counsel to represent a class of persons interested in a matter for the purpose of instituting or attending on an application or hearing before the commission or another tribunal or authority.

(2) The commission may fix the costs of the counsel and may order by whom and in what amount or proportion they be paid.

1980-60-132.

Costs of commission

117. (1) In this section, **"costs of the commission"** includes costs incurred by the commission for the services of consultants and experts engaged in connection with the proceeding.

(2) The commission may order that the costs of the commission incidental to a proceeding before it are to be paid by one or more participants in the proceeding in such amounts and proportions as the commission may determine.

1980-60-133; 1984-25-67; 1993-12-24.

Participant costs

118. (1) The commission may order a participant in a proceeding before the commission to pay all or part of the costs of another participant in the proceeding.

(2) If the commission considers it to be in the public interest, the commission may pay all or part of the costs of participants in proceedings before the commission that were commenced on or after April 1, 1993 or that are commenced after June 18, 1993.

(3) Amounts paid for costs under subsection (2) must not exceed the limits prescribed for the purposes of this section.

1980-60-133.1; 1993-12-25.

Tariff of fees

119. With the advance approval of the Lieutenant Governor in Council, the commission may prescribe a tariff of fees for a matter within the commission's jurisdiction.

1980-60-134.

No waiver of rights

120. (1) Nothing in this Act releases or waives a right of action by the commission or a person for a right, penalty or forfeiture that arises under a law of British Columbia.

(2) No penalty enforceable under this Act is a bar to or affects recovery for a right, or affects or bars a proceeding against or prosecution of a public utility, its directors, officers, agents or employees.

1980-60-135.

Relationship with *Community Charter* and *Local Government Act*

(AM) May 18/06

121. (1) Nothing in or done under the *Community Charter* or the *Local Government Act*

(a) supersedes or impairs a power conferred on the commission or an authorization granted to a public utility, or

(AM) Dec 01/07

(b) relieves a person of an obligation imposed under this Act or the *Gas Utility Act*.

(2) In this section, **"authorization"** means

(a) a certificate of public convenience and necessity issued under section 46,

(b) an exemption from the application of section 45 granted, with the advance approval of the Lieutenant Governor in Council, by the commission under

section 88, and

(c) an exemption from section 45 granted under section 22, only if the public utility meets the conditions prescribed by the Lieutenant Governor in Council.

(3) For the purposes of subsection (2) (c), the Lieutenant Governor in Council may prescribe different conditions for different public utilities or categories of public utilities.

1980-60-136; 2000-7-191, Sch.; 2003-52-497; 2006-24-53; 2007-14-201 (B.C. Reg. 354/2007)

Repealed

(REP) Nov 19/04

122. *Repealed.* [2004-45-172]

Service of notice

(AM) Dec 01/07

123. (1) A notice that the commission is empowered or required to give to a person under this Act must be in writing and may be served either personally or by mailing it to the person's address.

(2) If a notice is mailed, service of the notice is deemed to be effected at the time at which the letter containing the notice, properly addressed, postage prepaid and mailed, would be delivered in the ordinary course of post.

1980-60-138; 2007-14-196 (B.C. Reg. 354/2007).

Reasons to be given

124. (1) If an application to the commission is opposed, the commission must prepare written reasons for its decision.

(2) If an application is unopposed, the commission may, and at the request of the applicant must, prepare written reasons for its decision.

(3) Written reasons must be made available by the secretary to any person on payment of the fee set by the commission.

(REP) May 29/03

(4) *Repealed.* [2003-46-20]

1980-60-139; 2003-46-20.

Regulations

125. (1) The Lieutenant Governor in Council may make regulations as referred to in section 41 of the *Interpretation Act*.

(2) Without limiting subsection (1), the Lieutenant Governor in Council may, for the purpose of recovering the expenses arising out of the administration of this Act in a fiscal year, make regulations as follows:

(a) setting, or authorizing the commission to set, by order of the commission, and to collect fees, levies or other charges from

(i) public utilities, a class of public utility or a particular public utility, and

(ii) other persons to whom a provision of this Act applies or a class of those persons;

(b) setting, or authorizing the commission to set, the fees, levies or other charges payable by the members of the different classes referred to in paragraph (a) in different amounts;

(c) exempting, or authorizing the commission to exempt, a public utility or other person, or a class of either of them, from the payment of a fee, levy

or other charge;

(d) authorizing the commission to retain all or part of any fees, levies or other charges collected by the commission under a regulation.

(3) The commission may make regulations on a matter for which it is empowered by this Act to make regulations.

1980-60-140; 1982-54-29; 1988-63-8.

(ADD)**Minister's regulations**
May
01/08

125.1 (1) In this section, **"minister"** means the minister responsible for the administration of the *Hydro and Power Authority Act*.

(2) The minister may make regulations respecting the government's energy objectives, as defined in section 1, including, without limitation, regulations as follows:

(a) defining a word or phrase used in the definition;

(b) prescribing actions and goals for the purposes of paragraph (f) of the definition;

(c) establishing factors or guidelines the commission must use in considering the government's energy objectives, including guidelines regarding the relative priority of the objectives referred to in paragraphs (a) to (f) of the definition.

(3) A regulation under subsection (2) may be made with respect to the government's energy objectives generally or with respect to their application in any particular case.

(4) The minister may make regulations as follows:

(a) making declarations for the purposes of section 5 (7);

(b) respecting exemptions under section 22;

(c) respecting reports to be provided to the commission by the authority under section 43 (1.1), including, without limitation, respecting the jurisdictions with which comparisons are to be made, the rate classes to be considered, the factors to be used in making the comparisons and conducting the assessments, and the meaning to be given to the word "competitive";

(d) prescribing, for the purposes of paragraph (a) (i) of the definition of "demand increase" in section 44.1 (1), an amount representing an increase in resource requirements of the authority not related to an estimated increased demand referred to in section 44.1 (4) (b);

(e) for the purposes of section 44.1 and 44.2,

(i) prescribing rules for determining whether a demand-side measure, or a class of demand-side measures, is adequate, cost-effective or both,

(ii) declaring a demand-side measure, or a class of demand-side measures, to be cost effective and necessary for adequacy,

(iii) prescribing rules or factors a public utility must use in making the estimate referred to in section 44.1 (2) (a), and

(iv) prescribing rules or factors the authority must use in making the estimate referred to in section 44.1 (4) (b);

(f) prescribing requirements for the purposes of section 58 (2.1) (a);

(g) prescribing factors and guidelines for the purposes of section 58 (2.1) (b), including, without limitation, factors and guidelines to encourage

(i) energy conservation or efficiency,

(ii) the use of energy during periods of lower demand,

(iii) the development and use of energy from clean or renewable resources, or

(iv) the reduction of the energy demand a public utility must serve;

(h) defining a term or phrase used in section 58.1 and not defined in this Act;

(i) identifying facts that must be used in interpreting the definition in section 58.1;

(j) defining a term or phrase used in Part 3.1 and not defined in that Part;

(k) prescribing criteria respecting self-sufficiency for the purposes of section 64.01 (1) (a) and (b);

(l) prescribing targets for the purposes of section 64.02 (1) (a), guidelines for the purposes of section 64.02 (1) (b) and public utilities and classes of public utilities for the purposes of section 64.02 (2) (b);

(m) for the purposes of section 64.03, respecting eligible facilities, including prescribing generation facilities and classes of generation facilities, and respecting the standing offer to be established and maintained under that section;

(n) for the purposes of section 64.04, respecting smart meters and their installation, including, without limitation,

(i) the types of smart meters to be installed, including the features or functions each meter must have or be able to perform, and

(ii) the classes of users for whom smart meters must be installed, and requiring the authority to install different types of smart meters for different classes of users;

(o) prescribing standard-making bodies for the purposes of section 125.2 (1) and matters for the purposes of section 125.2 (3) (d);

(p) prescribing owners, operators, direct users, generators and distributors, or classes of any of them, for the purposes of section 125.2 (8).

(5) In making a regulation under this section, the minister may

(a) make regulations of specific or general application, and

(b) make different regulations for different persons, places, things, measures, transactions or activities.

2008-13-17.

(ADD)**Adoption of reliability standards, rules or codes**
May
01/08

125.2 (1) In this section:

"reliability standard" means a reliability standard, rule or code established by a standard-making body for the purpose of being a mandatory reliability standard for planning and operating the North American bulk power system, and includes any substantial change to any of those standards, rules or codes;

"standard-making body" means

(a) the North American Electric Reliability Corporation,

(b) the Western Electricity Coordinating Council, and

(c) a prescribed standard-making body.

(2) For greater certainty, the commission has exclusive jurisdiction to determine whether a reliability standard is in the public interest and should be adopted in British Columbia.

(3) The transmission corporation must review each reliability standard and provide to the commission, in accordance with the regulations, a report assessing

(a)

any adverse impact of the reliability standard on the reliability of electricity transmission in British Columbia if the reliability standard were adopted under subsection (6),

(b) the suitability of the reliability standard for British Columbia,

(c) the potential cost of the reliability standard if it were adopted under subsection (6), and

(d) any other matter prescribed by regulation or identified by order of the commission for the purposes of this section.

(4) The commission may make an order for the purposes of subsection (3) (d).

(5) If the commission receives a report under subsection (3), the commission must

(a) make the report available to the public in a reasonable manner, which may include by electronic means, and for a reasonable period of time, and

(b) consider any comments the commission receives in reply to the publication referred to in paragraph (a).

(6) After complying with subsection (5), the commission, subject to subsection (7), must adopt the reliability standards addressed in the report if the commission considers that the reliability standards are required to maintain or achieve consistency in British Columbia with other jurisdictions that have adopted the reliability standards.

(7) The commission is not required to adopt a reliability standard under subsection (6) if the commission determines, after a hearing, that the reliability standard is not in the public interest.

(8) A reliability standard adopted under subsection (6) applies to every

(a) prescribed owner, operator and direct user of the bulk power system, and

(b) prescribed generator and distributor of electricity.

(9) Subsection (8) applies to a person prescribed for the purposes of that subsection despite any exemption issued to the person under section 22 or 88 (3).

(10) The commission may make orders providing for the administration of adopted reliability standards.

(11) The commission, on its own motion or on complaint, may

(a) rescind an adoption made under subsection (6), or

(b) adopt a reliability standard previously rejected under subsection (7)

if the commission determines, after a hearing, that the rescission or adoption is in the public interest.

(12) The commission, without the approval of the minister responsible for the administration of the *Hydro and Power Authority Act*, may not set a standard or rule under section 26 of this Act with respect to a matter addressed by a reliability standard assessed in a report submitted to the commission under subsection (3) of this section.

2008-13-17.

Intent of Legislature

126. If a provision of this Act is held to be beyond the powers of British Columbia, that provision must be severed from the remainder of the Act, and the remaining provisions of the Act have the same effect as if they had been originally enacted as a separate enactment and as the only provisions of this Act.

1980-60-142.

1.0 Reference: Cover Letter, Page 1

Q1.1 FBC indicates that it plans to complete and file a long term integrated system plan ISP in 2011. Please indicate the date upon which this is intended to be filed.

A1.1 FortisBC intends to file its Integrated System Plan by May 31, 2011.

Q1.2 On August 26, 2010, FBC indicated that it will participate in the building of a $900 million hydro electric plant in partnership with Columbia Power Corp. and Columbia Basin Trust. Please comment on how this project will impact on the investments set out in the FBC 2011 Capital Plan, if at all.

A1.2 FortisBC's parent company, Fortis Inc., is entering into a partnership to construct the Waneta Expansion Project. The Waneta Expansion Project will not have any impact on FortisBC's capital expenditures in 2011.

2.0 Reference: Application, Page 7, Line 27

Q2.1 FBC indicates that an evidentiary update will be filed in regard to the May 29, 2009 resource Plan. Please indicate when the update will be filed.

A2.1 FortisBC intends to file its evidentiary update for the 2009 Resource Plan by May 31, 2011.

3.0 Reference: Application, Page 8

FBC states in its application that it seeks approval for projects totaling $66.2 million in 2011 and $1.5 million in 2012. The expenditures are permanent for projects required "to sustain the life of existing assets, or are expenditures on Demand Side Management or General Plant".

Q3.1 Please indicate of the total amount forecasted, what amount is for expenditures to "sustain the life of existing assets".

A3.1 Please refer to Table 1.2 from the Application (Exhibit B-1, page 1-10-11). Of the $67.7 million requested for 2011 and 2012, $24.5 million has been identified as sustaining capital.

Q3.2 To the extent the expenditures are "to sustain the life of existing assets" from an accounting perspective, please indicate what amount may also have been interpreted as operating and maintenance expenditures as opposed to capital under Generally Accepted Accounting Principles.

A3.2 None of the sustaining capital expenditures can be considered operating and maintenance expenditures. Each project meets the requirements of FortisBC's capitalization policy, which is in accordance with Canadian GAAP.

4.0 Reference: Application, Page 15

Q4.1 FBC indicates that South Slocan Plant Automation presently "utilizes a time based Maintenance system in its generation facilities" and intends to move "towards a condition based maintenance system". Please describe what is the industry standard with respect to maintenance system for generation facilities.

A4.1 Presently, the industry standard with respect to maintenance systems for generation facilities is a combination of time-based preventive maintenance and condition based maintenance where automated monitoring of the relevant parameters has been installed.

5.0 Reference: Application, Page 36, Unplanned Growth Projects

Q5.1 Page 37, lines 11 through 14 indicates FBC's "estimates are based on a three year average of historical expenditure from 2007 to 2009, adjusted for inflation and changes in overheads." Is this approach a common industry standard to budgeting unplanned growth projects?

A5.1 This is a common industry approach for this type of capital project.

6.0 Reference: Application, Page 37, Distribution Urgent Repairs

Q6.1 FBC utilizes "a three year average of historical expenditures from 2007 to 2009, adjusted for inflation and changes to overhead." Is this a common industry standard to budget this item?

A6.1 Please refer to the response to BCMEU IR No. 1 Q5.1 above.

7.0 Reference: BCUC IR #1, Question 11.4

The response provides: "this program is previously been approved as capital by the Commission, at minimum, since the Company entered into the current term of the Performance Based Regulation mechanism (Order G-58-06), and therefore the treatment of this capital component cannot be changed without impacting the capital Operating and Maintenance component of revenue requirements." The BCMEU is trying to determine whether there is a risk of items moving between operating and maintenance, and capital given the potential interpretation issues which may arise.

Q7.1 Please describe what safeguards are in place to ensure that activities which may fall on either side of that definition of capital or O&M are kept consistent from year to year.

A7.1 The Company has several safeguards in place to ensure that there is consistent treatment of expenditures year to year including:

- A Capitalization Policy (provided as BCMEU IR1 Attachment A7.1a) that ensures that only those expenditures that meet the capitalization criteria are classified as capital;
- Written process narratives for Budgeting, Forecasting and Capital Budgeting (attached as BCMEU IR1 Attachment A7.1 b) that are certified quarterly by the respective process owner and reviewed by Internal Audit; and
- Monthly reports providing variance explanations of Operating and Capital expenditures

Please also refer to the response to BCUC IR No. 2 Q11.2.

In addition, FortisBC confirms that, to the best of its knowledge, since entering into the current PBR agreement, items that were previously treated as O&M have continued to be treated as such, and items

previously treated as capital expenditures have likewise continued to be treated as such.

Capitalization Policy

This Capitalization Policy provides guidelines for the allocation of costs to either Capital or Operating Expense. These principles are intended to conform to Generally Accepted Accounting Principles as outlined in the CICA Handbook (GAAP), regulatory requirements as well as industry best practices. Where differences exist between this policy and BCUC Orders, the regulatory Order will prevail.

FortisBC's capital spending policy provides uniformity and consistency throughout the organization for the accounting of assets that are acquired, built, developed, installed, retired, removed or replaced. This policy should be used to complete both the operating and capital budgets.

Capitalization Principles:

1. All expenditures are considered Operating Expense until it is proven that they meet the capital criteria.
2. In certain cases neither GAAP nor regulatory requirements provide definitive rules that apply to every possible situation. In these cases, prior to approval of the expenditure, the Manager of the department initiating the project should confirm with the Manager, Budgets and Forecasts whether the project is capital or expense.
3. Costs include the amount to acquire, construct, develop or better an asset.
4. Capital assets include but are not limited to land, buildings, property, equipment, machinery, poles, wires, insulators, underground cable, furniture and fixtures, tools and instruments, computers, software, motor vehicles, reservoirs, dams and waterways, water wheels and turbines.
5. All capital assets will be shown at historical cost.
6. Capitalization of all costs will be based on effort (including all support functions) associated with the capital work being performed.
7. Staff will direct charge to projects where possible.
8. Where there is a regulatory GAAP variance, a copy of the variance will be filed with the finance department.

Capital Expenditures are expenditures in excess of $1,000 and that meet all of the following criteria:

1. Provide substantial benefits for a period of more than one year.
2. Extend the useful life of an asset or increase the capacity of an asset or the quality of output efficiency and may reduce operating costs (non-recurring expenditures) Note: this does not include routine maintenance.
3. Are held for use to conduct business/generate income.

Capital Expenditures include the following costs:

- Internal Labour costs directly charged
- Contract Work directly charged
- Vehicle Hours directly charged
- Materials & Supplies directly charged
- Overhead recoveries as outlined below
- AFUDC (Allowance for Funds Used During Construction)

Capitalization Policy

Additional Guidelines

Investigative Spending Projects

1. Investigative projects are defined as projects requiring investigation work to be completed before a proper scope and budget estimate can be submitted.
2. Investigative projects require an order to be set up to capture dollars while investigation is under way and will be reported as a deferred charge.
3. Once a capital project is set up the dollars will transfer to this approved project.
4. If a project is not approved the dollars in this project will be charged to Operating Expense.

Cost of Removal and Retirement

1. When an asset is retired from service, the asset account will be credited with the historical cost of the asset being removed.
2. If the asset being retired is a depreciable asset, the historical cost less any net salvage value and/or any insurance recovered, will be charged to accumulated depreciation.
3. If any material is salvaged, the net salvage value is the salvage value less any removal costs.
4. Salvage value is, if the material is sold, the selling price, or if the material is retained for use by the company, the original cost.

Staff Training & Development

1. Training to operate or maintain a new plant facility (e.g. substation) being constructed may be capitalized as a part of construction costs.
2. Training and other ongoing support costs related to IT software projects must be treated as an operating expense.
3. General training, once a plant facility is in service must be treated as an operating expense.

Repairs and Improvements

1. **Ordinary Repairs (Normally Operating Expenses)**
   Recurring or routine costs for parts, labour etc that do not extend the useful life of the capital asset but are necessary to keep the asset in normal operating condition (preventative maintenance costs/high wear items) are to be expensed.

2. **Extraordinary Repairs (Normally Capital Expenditures)**
   Large significant expenditures (relative to the total capital cost of the asset) for major repairs that extend the useful life of the capital asset and are not recurring in nature are generally to be capitalized.

3. **Improvements (Normally Capital Expenditures)**
   Involves the installation of a new part that is a betterment to the old part and will provide benefit in the form of greater output or lower operating costs for many years

Questions:

Should you have any questions pertaining to the above policy please contact the Manager, Budgets and Forecasts or the Controller.

FortisBC Inc
Regulatory & Budgeting – Narrative

Process: Regulatory & Budgeting
Significant Accounts: Operating Expense Accounts, Revenue Accounts, Fixed Asset Accounts
IT Applications: SAP – GL, Asset sub-ledgers, Project Management, CIS Plus

Beginning and Ending Points of the Process: Regulatory - preparation of annual Revenue Requirements application; BCUC approval. Budgets – annual budget cycle and financial plan – ongoing analysis and performance management
Purpose and Description: Describes the processes associated with developing and managing operating budgets, and the development and approval process for annual Revenue Requirements.
Owners: Manager, Budgets & Forecasts Manager, Regulatory Affairs **Other Participants:** Director, Regulatory Affairs Manager, Resource Planning Supervisor Regulatory & Financial Reporting Revenue and Margin Analyst Financial Analyst
Inputs: Billing data, HR data, GL data, asset data, other relevant data as required. **Outputs:** O&M Budgets, Revenue Forecast, Revenue Requirements Application. Variance Analyses for same.

1.0 Forecast Revenue

1.1 The Financial Analyst uses a spreadsheet with tariff rates, formulas and linkages for forecasting revenue. One of the inputs to this spreadsheet is the load forecast prepared by the Revenue and Margin Analyst. The load forecast is reviewed by the Manager, Resource Planning. The data is reviewed by the Financial Analyst with back up support from the Revenue and Margin Analyst. Accuracy of the load forecast input is overseen by the Accounting Supervisor and the Revenue and Margin Analyst. **(Control 3 - KEY)** The owner of this Key Control is the Accounting Supervisor.

1.2 The spreadsheets include various assumptions and factors that influence forecasting. These assumptions, influencing factors and model results are regularly challenged and modified where appropriate through regular review of the models by the Revenue and Margin Analyst, the Manager, Resource Planning, and other relevant stakeholders. .

1.3 Forecast load is reviewed by the Manager, Resource Planning, and included in the Revenue Requirements Application. The Application is signed off by members of the Executive, the

Director, Regulatory Affairs and designated/key members of the Application Team and is then submitted to the BCUC **(Control 2C – KEY).** The owner of this Key Control is the Manager, Regulatory Affairs.

2.0 Prepare Revenue Requirements

2.1 Regulatory strategies are determined by the Executive with primary responsibility residing with the Vice President, Regulatory Affairs and General Counsel, and the Director, Regulatory Affairs. These are communicated to Finance key participants (Controller; Manager, Budgets and Forecasts) for identification of Regulatory objectives and/or constraints.

2.2 Revenue Requirement entails development and documentation of complete Financial Plans for one or more years. A Schedule of Financial inputs is developed and managed by the Manager, Budgets and Forecasts, including:

- Reviewing Application inputs to ensure compliance with regulatory orders/requirements related to Revenue Requirements.
- Reviewing Application schedules to ensure they are accurate and that supporting documentation is complete.

2.3 Information is provided regarding the preparation and communication (to the Stakeholders required to provide inputs into the Revenue Requirement document specific to the Budget & Forecasting Department responsibility) of the timeline / deadlines of inputs for preparing the Revenue Requirements model and Application documents (specific to Budgets & Forecasting department only) for timely hand-off to the Regulatory Department. **(Control 2A) Owner: Budgets & Forecasting Department)**

2.4 Accuracy of financial inputs (reconciliation to GL and financial plan) is overseen by:

- Manager, Budgets and Forecasts: Property, Plant and Equipment and Operating Expenses;
- Manager, Corporate Reporting and Treasury: financing and taxes. **(Control 2B)**

2.5 Revenue Requirements model (Manager, Budgets and Forecasts, Supervisor Regulatory & Financial Reporting) and financial forecasts (Supervisor Regulatory & Financial Reporting) are constructed inter-dependently and compared on an ongoing basis to provide consistent results.

2.6 As part of the Application sign-off, the Revenue Requirements results (revenue numbers and model) are reviewed and signed-off by members of the Executive, the Director, Regulatory Affairs, and key/designated members of the Application Team **(Control 2C – KEY).** The owner of this Key control is the Manager, Regulatory Affairs.

3.0 Submit Rates for Approval to BCUC

3.1 Content, format, assignments and schedule for Application communicated to key participants and managed by Manager, Regulatory Affairs.

3.2 Production and control of Application documents is managed by Manager,, Regulatory Affairs.

- Application documents are maintained exclusively by the Regulatory Analyst. The documents are maintained and worked on in Microsoft based formats and stored on a restricted drive accessible by only the Regulatory Analyst and designated back-up persons **(Control 6).** The owner of this control is the Manager, Regulatory Affairs.
- Edits to the Final Draft are submitted to and approved by the Manager, Regulatory Affairs. The proposed changes are normally submitted by email or in hard copy and are retained only for a few days after the Application is filed.
- Once edits are finalized the document is stored on the restricted drive in both Microsoft Word and PDF format. A copy in PDF format is also available on the general access drive. A Quality Assessment of the Application is performed by designated / key members of the Application Team along with the Manager, Budgets and Forecasts. This review is conducted to ensure that data is supported and that information is correct and consistent throughout the document. (Control 5 – **KEY**) The owner of this Key Control is the Manager Budgets & Forecasts.

3.3 The Application is reviewed and signed off by the members of the Executive, the Director, Regulatory Affairs, and designated/key members of the Application Team **(Control 2C– KEY).** The owner of this Key Control is the Manager, Regulatory Affairs.

4.0 Prepare Operating Expense Budget

4.1 Budget Guidelines, instructions, and timelines for departments are communicated verbally and in writing by the Budget and Forecasts Department. **(Control 7)** The owner of this Key Control is the Supervisor Regulatory & Financial Reporting.

4.2 The Supervisor Regulatory & Financial Reporting prepares templates for O&M budgets incorporating:

- Current year budgets and estimates provided for reference;
- Staff, wage and salary rates, time away for individual cost centers obtained from HR.
- Benefits load, utilizing forecast cost of benefits;

The templates are provided in a spreadsheet format containing formulas and linkages to calculate budget totals. The relevant Managers and Supervisors input data into the required cells.

4.3 Budget templates are password protected, with exception of specific input cells, in order to restrict changes to formulas and linkages **(Control 13).** The owner of this Key Control is

the Supervisor, Regulatory & Financial Reporting.

4.4 Budget instructions are sent to relevant managers and supervisors via email, while the budget templates are made available through a SharePoint site for completion. SharePoint provides version control, restrictive access to only designated managers, and an audit trail of changes **(Control 8 – KEY).** The owner of this Key Control is the Supervisor, Regulatory & Financial Reporting.

4.5 Managers present and defend their budgets to their respective VPs to obtain their preliminary approval. Once approval is given, the managers enter their budget into SAP but they are not yet locked down.

4.6 The Supervisor Regulatory & Financial Reporting compares the budgets in SharePoint to the amounts recorded in SAP.

4.7 All of the budgets are rolled up, reviewed, adjusted and balanced to meet the BCUC approved budget **(Control 9 – KEY)** and approved by the Executive.

4.8 Any changes to the budgets from this review are communicated down to the respective managers who alter their budgets in SAP, which are then locked down by request to the Supervisor, Financial Systems through email instructions from the Supervisor, Regulatory & Financial Reporting. If changes are required to the budget after being locked down, the Supervisor, Regulatory & Financial Reporting must ask the Supervisor, Financial Systems to unlock the budgets in SAP (for O&M) so that the budget changes can be made. **(Control 10 – KEY).** The owner of this Key Control is the Supervisor, Regulatory & Financial Reporting.

4.9 Supervisor, Regulatory & Financial Reporting , verifies, on a quarterly basis, that SAP version 100 (for B000260) still equals version 260 for the year by running SAP report Y_ID1_70000016 **(Control 14).** The Supervisor, Regulatory & Financial Reporting also verifies, on a quarterly basis, that SAP version 100 is locked by attempting to make a change to a budget number in SAP report, KP06 **(Control 15).** The owner of these Controls is the Supervisor Financial & Regulatory Reporting.

5.0 Manage Operating Budget

5.1 Variances to budget by cost centre are downloaded from SAP, prepared by Supervisor, Regulatory & Financial Reporting and circulated monthly for variance explanations.

5.2 Explanations for current month and year to date variances from budget are provided by department managers. Current year estimates are updated monthly by Managers and submitted with full-year variance explanations **(Control 11 – KEY).** The owner of this Key

Control is the Supervisor, Regulatory & Financial Reporting.

5.3 A consolidated variance report is prepared by the Supervisor, Regulatory & Financial Reporting. Explanations are reviewed by Manager, Budgets and Forecast for reasonableness prior to circulation to Managers, Directors, and the Executive.

V.P. approval is required (in e-mail to Supervisor, Regulatory & Financial Reporting) for any current year estimates that exceed original budget **(Control 12).** The owner of this control is the Supervisor, Regulatory & Financial Reporting.

What Could Go Wrong (WCGW) and the Related Controls	
WCGW	Revenue Requirements Application is inaccurate and gives rise to rates that do not recover the utility's costs.
Controls	[1] This control number is not in use at this time. [2A] Budgets and Forecasts utilizes a Schedule/timeline with deadlines which is communicated to Stakeholders providing inputs to ensure timely hand-off to the Regulatory Department. [2B] Accuracy of financial inputs (reconciliation to GL and financial plan) is overseen by Manager, Budgets and Forecasts(Property, Plant and Equipment and Operating Expenses) and Manager, Corporate Reporting and Treasury (financing and taxes). [2C] The Application is reviewed and signed off by members of the Executive, the Director, Regulatory Affairs and designated/key members of the Application Team. **(Key Control)**
WCGW	Models contain flaws or false assumptions leading to inaccurate forecasts and inability to recover revenue requirements.
Controls	[3] Revenue Requirements Spreadsheet cells contain embedded formulas, linkages and built-in cross-checks to perform calculations. Inputs are compiled by the Financial Analyst and reviewed by the Revenue and Margin Analyst as well as the Accounting Supervisor. **(Key Control)** [2] [2C] The Application is reviewed and signed off by members of the Executive, the Director, Regulatory Affairs and designated/key members of the Application Team. **(Key Control)** [2B] A review within the Finance Group is performed prior to handing over the document to Regulatory Department [4] This control number is not in use as this time. [13] Budget templates are password protected, with exception of specific input cells, in order to restrict changes to formulas and linkages.
WCGW	Inability to support forecasts due to lack of integrity of documents and models.
Controls	[3] Revenue Requirements Spreadsheet cells contain embedded formulas, linkages and built-in cross-checks to perform calculations. [5] A Q&A of the Application is performed by designated / key members of the Application Team along with the Manager, Budgets and Forecasting. This review

	is to ensure that the data is supported and that information is correct and consistent throughout the document / model **(KEY Control).**
WCGW	Application to BCUC contains inaccurate or incomplete data
Controls	[5] A Q&A of the Application is performed by designated / key members of the Application Team along with the Manager, Budgets and Forecasting. This review is to ensure that the data is supported and that information is correct and consistent throughout the document / model **(KEY Control).** [6] Application documents are stored on a restricted access drive. [2] [2C] The Application is reviewed and signed off by members of the Executive, the Director, Regulatory Affairs and designated/key members of the Application Team. **(Key Control)** [4] This control number is not in use as this time.
WCGW	Operating Budgets are inaccurate
Controls	[7] Budget guidelines and instruction provided to Managers. [13] Operating Budgets Spreadsheet controls are utilized in budget templates, including password protection that prevents access to cells containing imbedded formulas and links, limiting Managers' inputs to specific regions in the template that are linked to the formulas that perform calculations. [8] Manager's budget spreadsheets kept on SharePoint site that provides version control, restrictive access to only designated managers, and an audit trail of changes. **(KEY Control)** [9] Budget submissions reviewed by VPs, CFO and CEO and balanced to agree to the BCUC approved O&M budget. **(KEY Control)**
WCGW	Unauthorized or undetected changes to approved budget spreadsheet or loss of data.
Controls	[8] Manager's budget spreadsheets kept on SharePoint site that provides version control, restrictive access to only designated managers, and an audit trail of changes. **(KEY Control)** [10] Final budget version locked in SAP that can only be changed through a special request from the Supervisor, Regulatory & Financial Reporting to Information Services to unlock the budget files in SAP. **(KEY Control)** [14] Supervisor, Regulatory & Financial Reporting verifies on a quarterly basis that no changes have occurred in the locked down budget by comparing version 100 to version 260.

	[15] Supervisor, Regulatory & Financial Reporting verifies quarterly that SAP budget version 100 is still "locked" by confirming SAP will not allow any change to a budget number (using report KP06).
WCGW	Lack of timely and accurate analysis for decision-making
Controls	[11] Managers provide full year expense forecasts each month and variance explanations for review by Executive. **(KEY Control)** [12] V.P. approval is required for any yearend spending estimates that exceed original budget.

FortisBC Inc
Property, Plant and Equipment - Narrative

Process: Property Plant and Equipment **Sub-Processes:** Plan Capital Manage Capital Expenditures Complete Capital Projects Complete AM/FM Retirements
Significant Accounts: Capital Assets, Accumulated Depreciation, Accounts Payable, Work in Progress
IT Applications: Microsoft Outlook, SAP, Excel, Open Item Database, Automated Mapping/Facilities Management (AM/FM)

Beginning and Ending Points of the Process: Forecasting the Capital Budget to Retiring the assets.
Purpose and Description: Describe processes of Property, Plant and Equipment including capital forecasting and approval, managing capital projects, project completion, utilization and retirement.
Owners: Manager, Budgets and Forecasts Budgets & Forecasts Analyst **Other Participants:** Manager, Engineering Manager, Generation Manager Information Systems Manager, Major Projects Project Managers
Inputs: Capital project requests, capital expenditures, capital amortization rates **Outputs:** Capital Budgets, Capital Progress and Variance reports, capital amortization and retirements

1.0 Plan Capital

1.1 Forecast Capital Budget

In the year of filing of the FortisBC Inc. multi-year Capital Plan, the Budgets & Forecasts Analyst/ Manager Budgets & Forecasts sends out a budget template with guidelines **(Control 1)** and timelines to Manager Engineering for ensuring distribution to all relevant departments for compiling the next year's capital budget. The relevant departments provide Project Costs for all Projects in the Budget Template that is uploaded in a SharePoint Site, which will be a part of the multi-year Capital Plan.

The Manager, Budgets and Forecasts reviews the submitted projects for reasonableness and appropriateness. **(Control 3 – KEY)** The templates are compiled from the SharePoint site by the Budgets & Forecasts Analyst/Manager Budgets & Forecasts in a master capital budget spreadsheet that is retained on a restricted drive only accessible by Budgets and Forecasts. **(Control 5 – KEY)** Version and backup controls on these spreadsheets are used to ensure that a trail of all revisions is maintained and that the most current version of the budget can be identified. **(Control 6)**

Upon compilation, all stakeholder departments along with their respective Managers review the master Capital Project spreadsheet and if required necessary amendments are made. Once complete, the VP's, CFO and CEO review the budget. **(Control 8 – KEY)** If not approved, the departments are given specific instructions to make the changes. Once approved, this document forms the basis of presentation to the Board of Directors for approval.
Thereafter they are submitted for Board and BCUC approval. **(Control 4 – KEY)**

1.2 Approve and Create Projects

The capital budget is presented to the Board of Directors for approval. If the Board does not approve, details of the required changes are sent to the affected departments to amend the plan and the master budget template is amended accordingly. If the Board approves the budget the Manager, Budgets and Forecasts does a final review **(Control 14)** The Manager, Budgets and Forecast agrees the Capital Expenditure Plan to the Board-Approved budget. **(Control 14)** and the Board approved multi-year Capital Plan is then presented to the BCUC for approval **(Control 4 Key)**.

Subsequent to BCUC approval, the Budgets & Forecasts Analyst sets up the projects in SAP. The BCUC approved budget is reviewed by Manager Budgets and Forecasts against the budget entered in SAP **(Control 12)** before being locked down **(Control 13 – KEY)** in SAP by the Budgets and Forecast Analyst. A written confirmation of the lock down will be supplied by the Budgets and Forecast Analyst to the Supervisor, Financial Systems and Internal Audit. **.** The Budgets and Forecasts Analyst is the only person that can update the budget in SAP. **(Control 10).** Each department is responsible to verify the accuracy of the budget input to SAP to ensure completeness, avoid duplications, and to ensure that the full costs and estimates for multi-year projects are correctly entered in SAP. (Control 11 – **KEY)**
BCUC may ask for a CPCN (Certificate of Public Convenience and Necessity) for certain projects. If so, a deferred project may be created to capture development costs. Each CPCN is treated on an individual basis by BCUC, and once approved by the BCUC a capital project can

then be set up by the Budgets & Forecasts Analyst in SAP. A Project Assistant creates a JV to transfer all previous deferred costs into the capital project, which is reviewed by the Budgets & Forecasts Analyst prior to being entered in SAP.

2.0 Manage Capital Expenditures

2.1 Incurring and Recording Capital Expenditures

Individual capital projects are set up in SAP to facilitate capturing the various costs applicable to those projects. **(Control 15)** Project Managers are responsible for ensuring correct coding and that the appropriate Financial Authority levels are provided for all costs charged to the various projects. **(Control 16 – KEY)** Confirmation of the approvals and coding of the costs is provided through the processes outlined in the following narratives:

- Accounts Payable
- Inventory
- Payroll
- Purchasing and Contracts

In addition, SAP security controls restrict access to the capital project budgets to only those authorized to create and modify capital projects. **(Control 10)**

2.2 Reporting and Forecasting Capital Expenditures

As required, the Project Managers review the accumulated capital costs in their projects in SAP.

After the capital projects receive any applicable Capitalized Overhead and Allowance for Funds Used During Construction (AFUDC) at the end of each month, the Budgets & Forecasts Analyst extracts data from SAP to prepare a "Capital Progress Report" spreadsheet file for distribution to the Project Managers. The Project Managers review this report to:

- ensure that it contains only valid projects;
- ensure that charges against the projects are appropriate; and
- to update the current estimates for the year in SAP.

The Budgets & Forecasts Analyst updates the "Capital Progress Report" from any input from the Project Managers and stores this information on a secure drive that only the Budgets & Forecasts Department, including others who may have temporary access to the same folder, can access. **(Control 5 – KEY)** The Budgets & Forecasts Analyst then prepares a "Capital Variance Alert" report on which the Project Managers provide their variance explanations. **(Control 17 – KEY)** The Budgets & Forecasts Analyst finalizes the "Capital Variance Alert" report with the variance explanations and compares current / future estimate in SAP to BCUC Approval **(Control-11 KEY)** and distributes it to all managers and the executive team.

2.3 Monitor and Control System and Third Party Projects

Each quarter, Project Managers prepare a Quality, Schedule, Cost (QSC) report for their projects or programs. The elements of this report include:

- **Quality** – covers project scope;
- **Schedule** – covers achievement towards milestone dates and the status of contracts; and
- **Costs** – cover actual and forecast project expenditures for the current year and for the total project from inception.

Normally, project costs are put into a Cash Flow spreadsheet report by the Project Manager or the Financial Analyst. To this, the Project Manager forecasts the remaining months to derive a total project forecast amount. The QSC report is reviewed and queried by the Manager of Projects in conjunction with the Monthly Capital Progress Reports to confirm the status of the capital projects. Quarterly, Project Managers give project presentations to Senior Management.

3.0 Complete Capital Project

3.1 Complete System Projects

Once the Project Managers determine that new assets are deemed "used and useful", they approve the Project Closeout form. **(Control 18)** They then send a closing e-mail to the Budgets & Forecasts Analyst in Budget and Forecasts who maintains record of such emails, stops AFUDC, updates the Settlement Rules if necessary. When all costs are posted in SAP, Project Management has the Orders closed and sends an e-mail to the Budgets & Forecast Analyst requesting closure of the Project. Budgets & Forecast Analyst then verifies that all orders are in "closed" status, and then closes the project in SAP. **(Control 19)** All closed Projects are identified in the "Capital Progress Report / Capital Alert" as **"Closed Status".**
Note: Other operational controls offset the risk of a Project not being closed in a timely manner. Some of these operational controls are as follows:

a) Posting of costs in a prior year Project (not approved for the current year) requiring addition of the specific Project to the Capital Report / Alert necessitating balance to the Financial Statements and possible approval for its reinstatement initiating investigation.
b) Review of "Project Remarks" by Project Management may initiate relevant actions
c) Commissioning / Decommissioning Reports from SCC indicate Project Completion Status, which in turn shall act as backup information for Project Completion to Project. Management.

Budgets and Forecasts runs an SAP report on January 31 to identify orders that are still not yet in the Closed status. This findings of this Report may be relayed to the field for further investigations for Projects where they are closed or an explanation may be required to be provided to the Budgets & Forecasts Analyst for leaving a project open.

4.0 Manage Capital Expenditure

4.1 Amortization of Capital and Customer Contributions

Amortization rates are approved by BCUC and recorded in a table in SAP. These tables can only be changed by an SAP authority, but must be first unlocked by IT (See IT Control

Narrative – Manage Changes).

Amortization of the Asset sub-ledger is generated in SAP as part of the month end process. The report is reviewed by the Budgets & Forecasts Analyst / Project Manager (IFRS) as one of the month end steps and confirmation of this review must be received by the Systems Financial Assistant before it will be posted. **(Control 22)**

Amortization amounts for assets outside the asset sub-ledger are calculated by the Budgets & Forecasts Analyst based on the asset balances at the end of the previous year times the approved rate in SAP. These calculations are reviewed and approved by theSupervisor, Regulatory & Financial Reporting. A Journal Voucher for Amortization is prepared by the Budgets & Forecasts Analyst each month and is also approved by the Supervisor, Regulatory & Financial Reporting and then it is posted to the Accumulated Depreciation accounts in the General Ledger. (Control 23 – **KEY**)

4.2 Complete AM/FM Retirements for Distribution Assets

FortisBC's distribution assets are retired (removed or salvaged) through an interface from AM/FM to SAP that adjusts the SAP accounting asset records accordingly. **(Control 21)**

The AM/FM Data Integrity Group sends a spreadsheet file of retirements to Budgets and Forecasts. The Budgets & Forecasts Analyst downloads the AM/FM file and compares the information to the spreadsheet file, and then posts the AM/FM file of asset retirement to the SAP G/L. **(Control 20)**

What Could Go Wrong (WCGW) and the Related Controls	
WCGW	Capital Budget submissions are incomplete or missing.
Controls	[1] Capital guidelines and instructions are included with the budget template to assist business units in capital budget planning. [2] This internal control number is not used at this time. [3] Budgets and Forecasts confirm that Master Budget includes all submissions. **(KEY Control)**
WCGW	Unauthorized or inappropriate items (i.e. operating items) are included in the departmental capital budget submissions.
Controls	[4] Project justification is an ongoing process of the budgetary cycle, with the ultimate approval provided by the Board and BCUC. **(KEY Control)**
WCGW	Unauthorized changes are made to the Capital Budget spreadsheet (worksheet).

Controls	[5] Files stored on a restricted access drive that only authorized individuals can access. **(KEY Control)** [6] File version and backup controls are used to identify and track changes to the capital budget spreadsheet.
WCGW	Capital Budget Spreadsheet information is lost or destroyed.
Controls	[5] Files stored on a restricted access drive that only authorized individuals can access. **(KEY Control)** [6] File version and backup controls are used to identify and track changes to the capital budget spreadsheet.
WCGW	The Capital Budget is inaccurate or incomplete.
Controls	[7] This internal control number is not used at this time. [8] Senior Management approval of Capital Budget prior to presentation to the Board. **(KEY Control)**
WCGW	Incorrect or incomplete budget data is entered into SAP.
Controls	[9] This internal control number is not used at this time. [10] SAP controls restrict access to authorized individuals. [11] Budgets and Forecasts compares current/future estimate in SAP budget data to BCUC Approval. **(KEY Control)**
WCGW	Unauthorized changes of the Board-Approved Budget made in SAP.
Controls	[12] BCUC Approved budget compared to supporting documents by Budgets & Forecasts Analyst and to budget in SAP by Manager, Budgets and Forecasts. [13] The BCUC Approved version of the Capital Budget is locked down in SAP after the budget is entered. **(KEY Control)** [10] SAP controls restrict access to authorized individuals.
WCGW	Capital projects created in SAP are inaccurate, incomplete and created more than once.
Controls	[14] The Manager, Budgets and Forecasts agrees the Capital Expenditure Plan to the Board-Approved budget.

WCGW	Unauthorized or inappropriate costs or changes are charged to capital projects.
	[10] SAP controls restrict access to authorized individuals. [15] Projects must be set up in SAP to capture costs for each capital project. [16] Charges against a project are approved in accordance with the Approval Level Policy. **(KEY Control)** [17] Analysis and explanations of variances on the Capital Variance Alert report distributed to Senior Management. **(KEY Control)** [18] Project Managers review and approve Project Closeout form once assets are deemed "used and useful".
WCGW	Unauthorized changes are made to the Capital Progress Report spreadsheet.
Controls	[5] Files stored on a restricted access drive that only authorized individuals can access. **(KEY Control)**

WCGW	Project completions are incomplete, not properly authorized, or not capitalized on a timely manner.
Controls	[19] Budgets & Forecasts Analyst confirms "closed" status of projects in SAP.

WCGW	Assets no longer in use are not correctly recorded in the G/L.
Controls	[20] Budgets & Forecasts Analyst reviews and compares SAP postings to the spreadsheet file of retired assets prepared by AM/FM Group. [21] Interface from AM/FM to SAP automatically adjusts the assets records for retirement costs.

WCGW	Amortization of Assets is incorrect.
Controls	[22] Budgets & Forecasts Analyst / Project Manager (IFRS) reviews system report of amortization prior to it being posted in SAP. **[23]** Supervisor, Regulatory & Financial Reporting approves the annual amortization

	calculations as well as all manual entries for amortization of assets. **(KEY Control)**

Q7.2 Are there any policy statements, internal documents or directions which can assist in greater understanding of this approach to allocation of costs to capital or O&M expenses?

A7.2 Please refer to the response to BCMEU IR No. 1 Q7.1.

Q7.3 How is this monitored on a day-by-day operating basis?

A7.3 On an operating basis, this is monitored as follows:

- Normal approval processes of invoices and journal entries;
- Monthly variances analysis of capital and O&M; and
- Written process narratives certified quarterly by each process owner and reviewed by internal audit.

Please also refer to the response to BCMEU IR No. 1 Q7.1.

8.0 Reference: BUC IR #1, Question 12.3

Q8.1 Where a project contains normal operating conditions of the system and extends the life of the asset, how is the cost delineated between O&M and capital?

A8.1 The Company assumes the above question should read "…maintains the normal operating conditions…" If the project extends the life of the asset, it is classified as capital subject to the Company's capitalization policy as referred to in the response to BCMEU IR No. 1 Q7.1. Please also refer to the response provided to BCUC IR No. 2 Q11.1.

9.0 Reference: BCUC IR #1, Question 16.1

In its application, FBC indicates that future expenditures for unplanned growth projects are based on three year averages. Table BCUC IR1 A16.1 is set out below.

Table BCUC IR1 A16.1
Distribution Growth Projects – Unplanned Growth Projects

Year	2007	2008	2009	2010	2011
Actual Costs ($000s)	1,063	832	596		
Forecast Cost ($000s)	G-147-06		G-11-09		
	685	713	974	994	948
Variance in %	55.2%	16.7%	-38.8%		

Q9.1 The amounts for 2010 and 2011 do not appear to be based on the prior three year averages. Please explain.

A9.1 The forecasts for this program are not based solely on a rolling average method. The expenditures are based on a list of projects estimated based on experience and historical pricing averaged over the area. This category contains a number of discrete projects and the effort required to undertake detailed cost estimations for each would be significant compared to the value of the projects themselves. For these reasons, the cost estimates are derived from a combination of unit costing methodology, and historical expenditures on similar projects.

Please also see the response to BCUC IR No. 2 Q4.2

10.0 Reference: BCUC IR #1, Questions 17.1, Distributing Sustaining Programs and Projects – Distribution Urgent Repairs

Q10.1 What were the actual costs for Distribution Urgent Repairs in 2007, 2008, and 2009?

A10.1 Please refer to Table 4.3 from the Application (Exhibit B-1).

Q10.2 Are the 2010 and 2011 forecasts based on the prior year averages of those numbers?

A10.2 The 2011 forecast is based on the 2007 - 2009 average, adjusted for inflation and changes to overheads. The 2010 forecast identified in the 2009-2010 Capital Expenditure Plan was similarly based on a three-year average of expenditures.

11.0 Reference: BCUC IR #1, Question 18.1

Table BCUC IR1 A18.4
Distribution Sustaining Projects – Distribution Condition Line Assessment

Year	2007	2008	2009	2010	2011
Actual Costs ($000s)	928	692	659		
Forecast Cost ($000s)	G-147-06		G-11-09		
	637	678	599	667	938
Variance in %	45.7%	2.1%	10.0%		

Q11.1 The forecast costs for Distribution Line Condition Assessment do not appear to be based on prior year averages based on the information contained in Table BCUC IR1 A18.4. Please explain.

A11.1 Tthe forecasts for this program are not based solely on a rolling average method. The estimates are based on historical information adjusted for inflation and changes in overhead, as well as the knowledge of the distribution feeders being assessed.

Please also see the response to BCUC IR No. 2 Q4.2

12.0 Reference: BCUC IR #1, Question 19.1, Distribution Line Rehabilitation

Table BCUC IR1 A19.2
Distribution Sustaining Projects – Distribution Line Rehabilitation

Year	2007	2008	2009	2010	2011
Actual Costs ($000s)	1,231	3,000	2,634		
Forecast Cost ($000s)	G-147-06		G-11-09		
	1,606	1,645	2,848	3,209	2,331
Variance in %	-23.3%	82.4%	-7.5%		

Q12.1 Table BCUC IR1 A19.2 sets out the actual costs in 2007, 2008 and 2009. The forecasts in 2010 to 2011 do not appear to be based on the historical averages. Please explain.

A12.1 Tthe forecasts for this program are not based solely on a rolling average method. The estimates are based on historical information adjusted for inflation and changes in overhead, as well as the knowledge of the distribution feeders requiring work as identified through the previous years' assessments, supplemented with fund for the hot tap connector replacement initiative.

Please also see the response to BCUC IR No. 2 Q4.2

13.0 Reference: BCUC IR #1, Question 21.5, Distribution Sustaining Projects – Distribution Right-of-Way Reclamation

Table BCUC IR1 A21.5
Distribution Sustaining Projects – Distribution Right-of-Way Reclamation

Year	2007	2008	2009	2010	2011
Actual Costs ($000s)	641	327	558		
Forecast Cost ($000s)	G-147-06		G-11-09		
	609	593	621	646	578
Variance in %	5.3%	-44.9%	-10.1%		

Q13.1 Table BCUC IR1 A21.5 shows the actual costs in 2007, 2008 and 2009. The forecast costs in 2010 and 2011 do not appear to be based on the three year historical averages. Please explain.

A13.1 The forecast for 2010 and 2011 are based on prior three year actual costs, adjusted for inflation and changes in overhead loadings.

Please also see the response to BCUC IR No. 2 Q4.2

14.0 Reference: BCUC IR 1, Question #A24.4

Table BCUC IR A24.4
Distribution Sustaining Projects – Forced Upgrades and Line Moves

Year	2007	2008	2009	2010	2011
Actual Costs ($000s)	1,564	385	1,908		
Forecast Cost ($000s)	G-147-06		G-11-09		
	1,168	1,400	1,255	1,461	1,456
Variance in %	33.9%	-72.5%	52.0%		

Q14.1 Table BCUC IR1 A24.4 sets out the actual costs for Distribution Sustaining Projects – Forced Upgrades and Line Moves for the years 2007, 2008 and 2009. The forecasts for 2010 and 2011 do not appear to be based on three year historical averages as indicated by FBC. Please explain.

A14.1 The 2011 forecast is based on the 2007 - 2009 average, adjusted for inflation and changes to overheads. The 2010 forecast identified in the 2009-2010 Capital Expenditure Plan was similarly based on a three–year average of expenditures.

Please also see the response to BCUC IR No. 2 Q4.2

15.0 Reference: BCUC IR #1, Question 26.1

Q15.1 Please explain the implications and risks of deferring this entire project until the justification for the incremental reliability enhancements provided by stage 3 are developed and completed for review by the Commission.

A15.1 There is an immediate need to upgrade the communications infrastructure to ensure that what should be short-duration outage events (< 5 minutes) are not unnecessarily extended due to failures of the existing communications system. Additionally, the company is incurring unnecessary ongoing expenditures related to troubleshooting and repairs of the existing aging communications system. It is on these bases that the initial stage projects are justified. The reliability benefits provided by Stage 3 will ensure that transmission single-contingencies will not result in even short-duration outages to Kelowna-area loads. This incremental reliability improvement will be justified in a future application.

Put another way, the Stage 1 and 2 portions of the program will result in a reduction of the SAIDI index for customers in the Kelowna area, but will have no impact on SAIFI. Conversely, Stage 3 is intended to reduce the frequency of outages and thus will positively impact SAIFI, but will have little incremental impact on SAIDI.

16.0 Reference: BCUC IR #1, Question 26.3

Q16.1 FBC states:

> - The customer cost of interruption resulting from a one hour outage to all Kelowna load is approximately $5 million (for 250 MW of load in 2007 – Reference: response to BCUC IR1 Q18.4 in the Okanagan Transmission Project evidentiary record). This figure represents the costs to customers due to an extended supply outage (such as lost production, business disruption, societal impact, etc.); it is not simply the value of unsupplied electricity service by the utility.

Please explain how the proposed system will potentially shortened an outage assuming that FBC is made aware of the outage by customers immediately upon the outage occurring.

A16.1 The impact of a communications failure disrupting the ability of the System Control Centre (SCC) to be made aware of a system outage is only one aspect of the problem. Even if the immediate indication of a system fault is replaced by customer calls, it does not change the fact that the communications failure will prevent the SCC dispatcher from remotely operating any substation equipment in order to restore the customer load. Thus, it will still be necessary to call out field technicians to travel to the substations in order for equipment to be operated to restore the load. This latter restoration delay is much more significant than the initial outage indication delay.

Q16.2 FBC states:

> - Based on historical performance, failures of the currently installed communications systems will sometimes affect the ability to remotely restore the power system. As a result, what could be a short-duration outage (< 5 minutes) instead results in an extended outage. On average, this will result in an additional one hour outage affecting approximately 100 MW of load every 2 years.

Please provide historical examples and the frequency of occurrence of failures of the currently installed communications system which have resulted in outages of less than 5 minutes becoming extended outages.

A16.2 Following are two examples taken from FortisBC's transmission outage database:

- 2008/08/17 - Outage Report #87 – 50 Line (Sexsmith/Glenmore/Recreation substations) – outage duration 30 minutes – 15,689 customers (3,890 customer/hours) – "While restoring the system SCC lost all communications to the Kelowna area which caused the restoration of 50 line to take longer."
- 2006/06/09 - Outage Report #44 – Bell Terminal and 51 Line (Recreation/Saucier/OK Mission/Bell substations) — outage duration 1-1/2 hours - ~25,000 customers (32,000 customer/hours) - "[communications] failure at the Benvoulin office caused a delay in customer restoration due to communications failing at the substation RTUs."

System communication failures are not logged formally, however failures occur on a regular basis, usually several times per month with durations varying from seconds to hours.

Q16.3 In place of Option D, has FBC obtained a third party quote from a telecommunication service provider to come up with their costs?

A16.3 No, FortisBC has not obtained quotes from third-party providers. The estimates provided were based on typical costs for similar data services from FortisBC's current third-party telecommunications providers.

Q16.4 Which providers were approached?

A16.4 Please refer to the response to BCMEU IR No. 1 Q16.3 above.

Q16.5 Were any joint venture opportunities with telecommunication service providers or other utilities, or other third parties considered?

A16.5 FortisBC has not formally contacted other telecommunication companies to investigate possible joint ventures. FortisBC has very stringent security and reliability requirements for its operational telecommunications systems. Where the Company can obtain long-term, firm access to fibre through appropriate contractual agreements that are in the customers' interest, FortisBC is willing to consider joint opportunities with third-party providers.

Q16.6 Does FBC anticipate any other commercial value to this project by way of leasing dark fibre to third parties?

A16.6 As long as sufficient fibre is reserved for FortisBC's current and future needs, the Company is willing to consider leasing of excess fibre to third parties. While the unused fibre would have some commercial value, the Company has not currently determined a specific value for this unused infrastructure. Similar to current joint-

use pole contact revenue, this amount could be applied towards reducing customer rates.

17.0 Reference: BCUC IR#1, Question 27.1

Q17.1 Please provide a break down of the $0.667 million for engineering and final estimating of the project.

A17.1 The estimate for this phase of the project is derived from similar projects previously completed. A detailed cost breakdown was not developed.

18.0 Reference: BCUC IR#1, Question A31.3

The response states:

> A31.3 No, that is not the correct interpretation. The statement meant to suggest that when a vehicle is being replaced, and if it is prudent to do so, the Company may use some or the entire $100,000 contingency to upgrade the specification on the new replacement vehicle.

Q18.1 Are we understanding this response to be that it is possible that there could be presently unplanned upgrade to an existing vehicle or a replacement vehicle which would use the entire $100,000 contingency amount requested by FBC?

A18.1 Although it is possible, historically the Company has not used the entire $100,000 contingency fund on one large upgrade. Historically, only a small amount of the contingency fund has been used to upgrade vehicle specifications. The majority of the funds have used for unanticipated vehicle additions and/or the replacement of damaged vehicles.

Q18.2 Please provide an example where FBC has spent $100,000 upgrading the specification on a new replacement vehicle in the past five years.

A18.2 Please refer to the response provided to BCMEU IR No. 1 Q18.1

19.0 Reference: BCUC IR#1, Question 32.0

Q19.1 As FBC intends to replace all meters with the AMI project, is it reasonable to defer the approximately 2,500 meters forecasted to be exchanged as part of the meter compliance program until implementation of the AMI project?

A19.1 No, FortisBC will not be able to defer the meter exchanges planned for 2011. Following approval of the AMI Project by the Commission, the Company will apply to Measurement Canada to suspend compliance sampling during the deployment period, which is expected to begin in late 2012 or early 2013. FortisBC does not believe that deferral of the 2011 meter exchanges would be granted without certainty that the project will proceed.

20.0 Reference: BCUC IR#1, Question 42.0, Long-Term Facilities Solutions

Q20.1 Given the common ownership of Terasen Gas Inc. and FBC in terms of assessment of Long Term Facilities Solutions, do FBC and TGI look for common efficiencies in Terms of Facilities Solutions?

A20.1 Yes. Facilities and Operations staff from both entities are currently reviewing their respective service territories to identify common site locations. Long term facilities solutions are being developed incorporating efficiencies identified.

An example of an instance in which efficiencies are already being realized is the lease of FortisBC's head office space in Kelowna from Terasen Gas Inc. since January 1, 2008.

21.0 Reference: BCUC IR#1, Question 42.6 and 42.8

Q21.1 FBC is budgeting $100,000 in legal and regulatory costs for review of the Kootenay operations centre and Kelowna operations centre. Please describe what legal and regulatory costs are involved with a review of these sites and how these budgets were arrived at.

A21.1 The Company is anticipating spending approximately $50,000 of legal and regulatory costs for each of the reviews in order to undertake appraisals and environmental reviews.

1.0 Reference: Exhibit B-1-1, Appendix D to Appendix 3, Table 3, p.21 CDPR – End Use Model.

Q1.1 Do the forecast MWh include transmission and distribution losses or are they at the customer meter? If losses are included, what are losses as a percentage of the total forecast MWh?

A1.1 The forecast MWh do not include losses.

2.0 Reference: Exhibit B-1-1, Appendix D to Appendix 3, Table 8, p.34 CDPR – End Use Model.

Q2.1 Do the forecast MWh include transmission and distribution losses or are they at the customer meter? If losses are included, what are losses as a percentage of the total forecast MWh?

A2.1 The forecast MWh do not include losses.

3.0 Reference: Exhibit B-1-1, Appendix D to Appendix 3, Table 11, p.44 CDPR – Industrial Sector Retail Sales.

Q3.1 Do the forecast MWh include transmission and distribution losses or are they at the customer meter? If losses are included, what are losses as a percentage of the total forecast MWh?

A3.1 The forecast MWh do not include losses.

4.0 Reference: Exhibit B-1-2, Table 7.1, p.72 – 2011 Demand Side Management Plan.

Q4.1 What percentage of the economic and achievable potential in 2011 do the planned 2011 MWh savings by sector represent?

A4.1 The percentage of the economic and achievable potential in 2011 represented by the planned 2011 MWh savings, by sector, are as follows:

- Residential 86%;
- General Service and Irrigation 132%; and
- Industrial 720%.

Q4.2 If FortisBC is not planning on acquiring all of the 2011 economic and achievable potential in 2011, please explain for each sector why Fortis is not pursuing the full economic and achievable potential for 2011?

A4.2 FortisBC has based forecasts partly upon its historical experience with programs where relevant. It may not be possible to achieve all economic and achievable potential in certain sectors due to a variety of non-economic barriers such as stock replacement rates.

Q4.3 Do the MWh savings in this table include transmission and distribution losses or are they at the customer meter? If losses are included, what are losses as a percentage of the total MWh?

A4.3 Yes, energy savings at the customers meter are grossed up by line losses at 8.8 per cent.

5.0 Reference: Exhibit B-1-1, Appendix 3, 2011 Demand Side Management Plan, p.20; cover letter p.1

FortisBC states: "...FortisBC intends to escalate programs and spending further in subsequent DSM Plan years as internal capacity is developed."

FortisBC also states: "In 2011, the Company plans to complete and file a long-term Integrated System Plan, which will outline a 20-year horizon of planned investment spending on generation, transmission and distribution assets, general plant, and Demand Side Management in addition to the Company's plans to meet its electricity resource requirements." (Exhibit B-1, cover letter, page 1)

Q5.1 Is the DSM portion of FortisBC's long-term Integrated System available in draft at the present time? If so, please file a copy.

A5.1 A draft of the DSM portion of FortisBC's Integrated System Plan (ISP) is not available at the present time.

Q5.2 Please provide a table showing FortisBC's planned DSM spending and savings in the years following 2011, for as many years as FortisBC has done projections.

A5.2 This information is not available yet, but will be filed as part of the 2012 ISP.

Q5.3 Please describe the process FortisBC intends to follow in future years regarding Commission consideration of FortisBC's DSM spending. Does FortisBC intend to file annually a capital expenditure schedule (for DSM in the following year) under s.44.2 of the *Utilities Commission Act*?

A5.3 FortisBC intends to file its long term Demand Side Management Plan in 2011, which will identify a process for approval of future DSM expenditures.

6.0 Reference: Exhibit B-4, FortisBC response to BCUC IR 56.3

Q6.1 Please explain why income tax is deducted from the total DSM 2011 cost figure. Please explain the meaning or significance of "Total (net of tax)" in Figure 7.1, Exhibit B-1-2.

A6.1 Under current income tax regulations, expenditures on DSM are deductible for tax purposes and therefore the Company receives the tax benefit in the year incurred. The tax benefit is then deducted from the total DSM expenditure in order to recognize the benefit the Company has received by the tax deduction. BCUC Order G-55-95 specifically ordered the Company to record DSM expenditures in rate base net of tax, and BCUC Order G-52-05 directed the same treatment for all deferred charges except investigative spending and deferred PBR incentives.

Q1 Spill gate repair.

With Libby, Duncan, and Kootenay Canal now in full operation mode, what were the average peak flows at upper Bonnington in the last five years?

A1 Please see Table Gabana IR1 A1 below.

Table Gabana IR1 A1

Year	Kootenay Lake Elevation	Kootenay Lake Discharge	Upper Bonnington Discharge	Notes
		Cubic feet per second (cfs)		
2006	1751.6 ft	79,000 cfs	50,000 cfs	29,000 cfs through Kootenay Canal Tailrace (KCL)
2007	1750.3 ft	74,000 cfs	45,000 cfs	29, 000cfs through KCL
2008	1749.7 ft	69,000 cfs	41,000 cfs	28,000 cfs through KCL
2009	1747.8 ft	53, 000 cfs	24,000 cfs	29, 000 cfs through KCL
2010	1748.7 ft	62, 000cfs	34,000 cfs	28,000 cfs through KCL

Q2 What was the average flow prior to the completion of the above three dams?

A2 The typical Kootenay Lake discharge prior to 1965 was approximately 110,000 cfs. The maximum Kootenay Lake discharge on record occurred in 1961 and was 180,000 cfs.

Q3 What is the design capacity flow of the horse shoe at upper Bonnington?

A3 The spill capacity of the overflow weir is 200,000 cfs.

Q4 What are some of the scenarios if the gate upgrade was delayed for 2 years?

A4 The worst case scenario would be a gate failure or the failure of a gate to open when required. In the case of a gate failure during normal operations, there is the potential of a loss of power generation. During

flood conditions, there is the risk that the flood would overtop the dam causing flooding of the powerhouse.

Please also refer to the responses to BCUC IR No. 1 Q3.1, Q3.2 and Q3.3 for further details regarding the risk of delay to this project.

Q5 Since 1950 there have been 5 generation site completed. How many were constructed with windows?

A5 As FortisBC does not own any generating sites built since 1950, the Company is unsure which 5 generation sites are referred to in the question. However, as noted in the response to Gabana IR No. 1 Q6 below, modern powerhouses do not typically use windows to provide heating/cooling regulation, and consequently do not contain as many windows as compared to FortisBC's plants on the Kootenay River.

Q6 If you were to build the same structure today would windows be installed.?

A6 The need for windows in a new powerhouse would be dependent on many design considerations. In general, it has become more economical to construct the above grade portions of powerhouses from structural steel which would typically not include as many windows as found at existing FortisBC facilities. In addition, a structure built today would contain mechanically controlled plant and generator heating and cooling systems, and therefore would not require windows to provide that functionality.

Q7 How many windows have fallen out in the last 5 years.?

A7 No windows have fallen in the past 5 years.

Q8 What year did the window on page 10 of the 2011 generation handout disengage from it's location.?

A8 The window fell out August 2004.

Q9 If a catastrophic event occurred, is Fortis responsible for the passing of BC Hydro water allotment on the Kootenay River?.

A9 Yes, as FortisBC is the licence holder for Kootenay Lake.

Q10 Please show the total cost of all the generator upgrades on Kootenay River, and the amount of saleable power gained.

A10 Including the South Slocan Unit 1 and Corra Linn Unit 2 ULE (forecast for completion in 2012), the total value of all projects involving dam rehabilitation, unit life extension, and where warranted generator upgrades, is approximately $150 million.

With completion of the work discussed above, the Company will ensure continued long term access to the historic 202 MW of capacity (1,541 GWh) from its existing Kootenay River Plants, as well as an additional 25 MW (71 GWh) of generation resulting from the various generator upgrades undertaken.

Q11 In the 2011 Distribution page 10 the picture show a new line under construction. The decision to relocate was a result of Dept. of Highways. Is there a book value in the present line? If the answer is yes how do you cost it.

A11 Distribution lines are not individually accounted for, but rather are treated on a pooled asset basis. The Company's AM/FM system contains information on the number of poles and approximate vintage of distribution lines. If a distribution line or a portion of the line is retired from service, the retirement value can be estimated based on vintage unit cost from Statistics Canada's Construction Price Index for electric utility distribution systems.

Q12 As a result of the changes to the G S T and P S T please estimate the cost savings per year that Fortis can expect compared to an identical year without the changes.

A12 Under the new HST legislation, certain goods and services, which were previously subject to PST of 7 per cent and not recoverable for tax filing purposes, will instead be subject to HST and therefore permit the Company to claim a full Input Tax Credit (ITC) for HST on these costs. Over time this may result in a 7 per cent savings on certain costs (e.g. materials, legal fees, office supplies, software licenses, expenses relating to vehicles over 3,000 kg and maintenance contracts for office, computer equipment and software). However, the HST rules also restrict or recapture ITCs for the 7 per cent provincial portion of HST on certain expenses which are already subject to PST. Therefore, no savings are expected to be achieved on certain telecommunication expenses, passenger vehicle costs and certain energy use. Meals and entertainment expenses which were not subject to PST are now subject HST and a recapture of ITC on the 7 per cent portion of HST, resulting in an increase in these expenses.

The Company assessed the impact of the new HST rules on operating and maintenance expense (O&M) expected to be incurred for the last six months of 2010 and for the full 2011 year. The analysis considered actual 2008 and 2009 PST paid as well as the impact on meals and entertainment, self assessment of PST on own-use electricity and removal of the Innovative Clean Energy Fund (ICE) levy. The result of the analysis is an estimate of approximately $0.1 million in 2010 O&M savings, effective July 1, 2010 and approximately $0.2 million savings related to HST impacts in 2011 O&M.

The Company also assessed the impact of the new HST rules on capital expenditures expected to be incurred between July 1, 2010 and

December 31, 2010 and concluded that the variance in rate base was not material.

Q13 Fortis BC Fiber-Optic Network

When the line is completed as proposed what % of the line capacity will Fortis use. ?

A13 The amount of utilization differs depending on the location of the fibre-optic segment in the FortisBC system. This is due to varying requirements for power system protection communications, operational communications and corporate WAN communications. In general FortisBC currently uses between 10-30 per cent of the available fibres in any given line segment. The remaining capacity is reserved for use as spares and for future communications requirements. It should be noted that there is very little incremental cost associated with installing larger capacity fibre optic cable. The majority of the costs for the installation of fibre optic communication are related to physical construction requirements, and not the material cost of the fibre optic cable.

Q14 What % of the line capacity will Fortis used on the proposed line between Trail and Grand Forks?

A14 FortisBC would expect to use approximately 25 per cent of the available fibres in the fibre-optic cable section between Trail and Grand Forks.

Q15 Please explain the distribution of a $1000 of revenue to Fortis B C.

A15 In 2011, $1,000 in revenue is distributed as follows:

Power Purchases and Water Fees	$	329
Operating and Maintenance Expense		136
Depreciation of Plant and Equipment		164
Property Tax		49
Income Tax		19
Interest Expense		146
Return on Equity		157
Total	$	1,000

Q1 Please state in form of a quick summary whether and where new power lines will be constructed and/or old ones rebuilt.

A1 There is one proposed project in the 2011 Capital Expenditure Plan which identifies the need for new transmission line infrastructure: this is the Sexsmith-Ellison Transmission Tie project, which includes the overbuild of a 138-kV transmission circuit onto an existing distribution circuit. Other than this project, FortisBC is not seeking approval for any projects which require the construction of new transmission infrastructure. Notwithstanding this, there are a number of ongoing rehabilitation, rebuild and small capital programs which include the upgrade and/or replacement of localized transmission and distribution infrastructure, as well as the construction of distribution infrastructure as and when required to meet customer load. These projects will take place throughout the service area.

Q2 In case of section 1. is FortisBC planning to apply for an Certificate of Public Convenience and Necessity (CPCN) for any of them?

A2 No, FortisBC is not planning to file CPCN applications for the work discussed in the response to Karow IR No. 1 Q1. The projects do not meet FortisBC criteria for requiring the submission of a separate regulatory application.

Q3 Please state, whether in this proceeding the issue of smart meters is involved, if so, please give details.

A3 No, the issue of smart meters is not part of this proceeding.

Q4 **Please state, whether FortisBC will prepare for any telecommunication purposes other than for servicing FortisBC generation and/or transmission and/or distribution system. If so, please provide details, also whether other telecommunication companies will be allowed to use FortisBC transmission and distribution lines for their telecommunication purposes and whether CPCN application/s will have to be submitted by FortisBC and/or by other telecommunication companies.**

A4 At the present time, all FortisBC-owned communications infrastructure is required and used only for the operation of the regulated electric utility. FortisBC is willing to consider requests from telecommunications companies for access to communications infrastructure if the application is in the Company's and the customers' interest.