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202 Pages

FORTISBC INC. STAGE 2 PRUDENCY REVIEW
KETTLE VALLEY SUBSTATION **EXHIBIT** B-11

August 28, 2012

Via Email
Original via Mail

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

Dear Ms. Hamilton:

Re: Stage 2 Prudency Expenditure Review – Kettle Valley Distribution Source Project
Intervenor Information Request No. 1

Please find attached FortisBC's responses to Information Requests No. 1 from the Industrial Customers Group (ICG), British Columbia Pensioners' and Seniors' Organization et al. (BCPSO) and Norman Gabana.

Sincerely,

Dennis Swanson
Director, Regulatory Affairs

cc: Registered Intervenors

1.0 Reference: Exhibit B-10, BCUC IR No. 1, 4.2.1.1; BCUC IR No. 1, 5.2.1

"… this analysis only provided an estimate of what the potential escalations could be, it was felt that these cost increases, if they occurred, could be either mitigated or accommodated within the project contingencies."

"There was no calculation of cost escalation."

1.1 Please comment on whether or not "project contingencies" include price increases attributable to inflation, and please comment on whether or not "potential escalations" include price increases attributable to inflation?

Response:

Prior to, and at the time of, the Kettle Valley Project CPCN application, price increases attributable to inflation were typically nominal and were thus accommodated within project contingency estimates and were not explicitly identified.

"Potential escalations" can include two aspects:

1. Nominal cost increases over time due to normal expected inflation. While somewhat variable, these increases are typically no more than one to three percent annually.

2. Commodity and resource cost increases due to external market forces and economic conditions. These can be highly volatile (unpredictable) and may vary in both positive and negative directions.

1.2 Please provide any analysis, which was performed prior to the filing of the CPCN application, of cost escalations related to materials or labour that were included in "project contingencies'?

Response:

FortisBC has no record of any cost escalation analysis which was performed prior to filing the Kettle Valley Project CPCN application.

1.3 Please comment on whether or not "project contingencies" are expected to be expended, or as the above quote suggests are "project contingencies" amenable to mitigation and control?

Response:

As discussed in the response to ICG IR1 Q1.1 above, prior to, and at the time of, the Kettle Valley Project CPCN application, "project contingencies" were considered to accommodate a number of different aspects of project costs risks, including increases attributable to inflation. Hence, at the time it was considered that some aspects of project contingencies were amenable to mitigation and control.

1.4 Please explain why cost escalation should not always be considered to be a project risk?

Response:

As discussed in the response to ICG IR1 Q1.1, some level of cost escalation due to normal inflation over time is expected. This aspect is considered commonly known and thus is not (and was not) considered a significant risk. However, escalation due to commodity and resource volatility can be highly unpredictable. Historically, this type of escalation had not been encountered and thus was not identified at the time of the Kettle Valley Project CPCN application to be a significant project risk.

1.5 Please comment on whether or not "no calculation of cost escalation" means that cost escalation was not considered to be a risk to the Kettle Valley Project?

Response:

Please refer to the response to ICG IR1 Q1.4.

1.6 Please explain why the unique characteristics of cost escalation drivers and impacts should be "mitigated or accommodated within the project contingencies" and not controlled or otherwise managed as a unique cost control account?

Response:

While the question appears to be related to present-day practice, the fact is that, at the time of the Kettle Valley Project CPCN application, and consistent with prior capital projects, cost escalation was considered able to be accommodated within the project contingency. FortisBC

estimating practices have evolved since that time, particularly in the context of the revised CPCN Guidelines, and this is no longer the case.

1.7 Please provide any internal documents that define "contingencies" or that define "escalations" or that describe the cost estimating methodology to be followed at FortisBC?

Response:

Please refer to the response to ICG IR1 Q22.3 (and specifically ICG IR1 Appendix 22.3D) for the requested information. Please note that these are the current definitions and the estimating methodology used by FortisBC and were not in place at the time of the Kettle Valley Project CPCN application. At that time, there was no formal documentation covering the requested information.

1.8 Please identify, and provide a detailed CV of, all persons with economics expertise that were involved in the analysis of inflation effects on the project estimates?

Response:

Please refer to the response to ICG IR1 Q1.9 below.

1.9 Please identify all other persons involved in the preparation of the project estimates?

Response:

As discussed in the responses to BCUC IR1 Q10.10.2 and Q23.2, the project estimate was developed and reviewed by engineering and design staff who had considerable experience and technical expertise with preparing and reviewing such estimates for other similar projects within FortisBC. During the CPCN development process the cost estimate was then reviewed and checked by Planning, Engineering, Project Management and Finance personnel to ensure that the major project components were identified and the stated costs were consistent with previous, recently completed FortisBC projects.

A summary of the CVs for persons involved in the development of the Kettle Valley Project is provided below. Due to privacy considerations, names of specific personnel have been removed. Based on the information provided below, the Company submits that the development of the Kettle Valley Project was resourced with appropriate and qualified personnel.

Vice President, Transmission and Distribution

FortisBC's Vice President of Transmission and Distribution responsible for the planning, engineering, and daily operations of the transmission and distribution system.

The Vice President of Transmission and Distribution joined FortisBC in 2003. From 1999 to 2002, the Vice President of Transmission and Distribution served as General Manager for TransAlta Utilities responsible for all operations of a power generating station in Alberta. Prior to that, he held a number of engineering, planning and project management positions within TransAlta Utilities' Transmission and Generation departments.

The Vice President of Transmission and Distribution holds a Masters of Business Administration (2000) from Queens University and a Bachelor of Science in Civil Engineering (1989) from the University of Alberta. He is a member of the Association of Professional Engineers, Geoscientists of British Columbia, and is also a member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta.

Vice President, Generation (Immediately previous, Vice President, Operations)

FortisBC's Vice President of Generation is responsible for the operation and maintenance of the hydroelectric generating plants owned and operated by FortisBC, the operation of the system control centre, as well as overall responsibility for the resourcing of power supplies to meet system loads.

The Vice President of Generation has over 25 years of operational experience in the electrical utility industry, the last 14 of which have been spent with FortisBC and its predecessor companies. His prior experience includes 11 years with SaskPower, and he has worked in various operational, technical and senior managerial roles throughout his career.

The Vice President of Generation holds a Bachelor of Science in Mechanical Engineering (1976) from the Royal Military College of Canada. He is a member of the Association of Professional Engineers, Geoscientists of British Columbia.

Manager, Transmission and Distribution Planning

The Manager of Transmission and Distribution Planning is responsible for the short and long term capital planning of the transmission and distribution system.

The Manager of Transmission and Distribution Planning has over 30 years experience in the utility industry and joined FortisBC in 2003. Prior to joining FortisBC he was a Contract Power

Project Manager working for Entergy in Louisiana and Arkansas from 2000 to 2002. From 1997 to 1999 he was Senior Substation Engineer for Enmax. Prior to that, the Manager of Transmission and Distribution held a number of engineering, planning and operations positions with TransAlta Utilities.

The Manager of Transmission and Distribution has a Bachelor of Science in Electrical Engineering from the University of Saskatchewan and is a member of the Association of Professional Engineers and Geoscientists of British Columbia.

Senior Planning Engineer, Protection and Control

The Senior Planning Engineer, Protection and Control, is an electrical engineer with over 9 years of experience in electric utility power systems design, planning and operations.

The Senior Planning Engineer, Protection and Control, is responsible for FortisBC's protection, control and telecommunications planning and design. Prior to working for FortisBC, he was employed by a consulting engineering firm which provided services to the mining and utility sector in British Columbia.

The Senior Planning Engineer, Protection and Control, has a Bachelor of Applied Science (1994) from the University of British Columbia. He is a member of the Association of Professional Engineers, Geoscientists of British Columbia and a Senior Member of the Institute of Electrical and Electronic Engineers (IEEE).

Regional Planning Engineer

The Regional Planning Engineer joined FortisBC in 2001 and is responsible for distribution planning and operation support for the Kootenay region. Prior to joining FortisBC he worked for BC Hydro and Ontario Hydro.

The Regional Planning Engineer has 37 years of utility experience as a professional engineer, including Generation, Transmission, Distribution and Customer Service, in roles of planning, testing, operation support, and energy management with utility networks up to and including 500 kV.

The Regional Planning Engineer holds a Bachelor Degree of Applied Science in Electrical Engineering from the University of British Columbia (1968). He is a member of the Association of Professional Engineers, Geoscientists of British Columbia.

Regional Planning Engineer

The Regional Planning Engineer joined FortisBC in 1997 and is responsible for distribution planning and operation support for the Okanagan region. Prior to joining FortisBC, from 1986 to 1997 he held a number of engineering positions with TransAlta Utilities in the areas of distribution standards, substation design, and transmission operations.

The Regional Planning Engineer holds a Bachelor of Science degree in Electrical Engineering (1986) from the University of Calgary. He is a member of the Association of Professional Engineers, Geoscientists of British Columbia.

Planning Engineer

The Planning Engineer is an electrical engineer with over 16 years of experience in electric utilities in multiple countries in system planning and operations.

The Planning Engineer joined FortisBC in 2005 and was responsible for system planning for transmission and distribution project projects. Prior to joining FortisBC, he was the Transmission & Distribution Manager for the Public Utilities Corporation, in the Republic of Seychelles.

The Planning Engineer has a Bachelor of Electrical Engineering – Honours (1989) from Jadavpur University, Calcutta, India. He is also a Chartered Engineer (Engineering Council of UK) and is registered in the International Register of Professional Engineers (IRoPE-UK Chapter). Please note that C.Eng Certification in UK is equivalent to P.Eng Certification in Canada. The Planning Engineer is also a member of the Institution of Engineering & Technology (IET-UK) and has several Technical Publications in various prestigious forums in USA, Canada & Africa.

Project Engineer

The Project Engineer is an electrical engineer with over three years of experience in electric utility power systems design, planning and operations.

As the Project Engineer for FortisBC, he is responsible for managing engineering quality, schedule and cost on FortisBC transmission and distribution projects. Prior to this, the Project Engineer was responsible for FortisBC's telecommunication engineering and design.

The Project Engineer has a Bachelor of Applied Science (2002) from the University of Victoria with specialization in the Telecommunications Option. He is a registered Engineer in Training with the Association of Professional Engineers, Geoscientists of British Columbia.

Senior Project Manager

The Senior Project Manager has worked in the electrical utility business since 1990, and has been with FortisBC and its predecessors since 1996. From that time until 2000, he served as the Manager, Safety and Health, responsible for all aspects of employee and public safety and health. In 2000 he became the Manager, Transmission and Distribution Operations, overseeing all powerline operation and construction. In 2003 he accepted a role as a senior project manager, ensuring safe and cost effective capital projects.

Prior to joining FortisBC, the Senior Project Manager spent six years with BC Hydro as a health and safety professional, specializing in construction project work.

The Senior Project Manager has a Diploma of Technology in Occupational Health and Safety from the British Columbia Institute of Technology. He is also a past recipient of Safety Professional of the Year honor, awarded by the Canadian Society of Safety Engineers.

Director of Regulatory Affairs

The Director of Regulatory Affairs joined FortisBC in 1981 and has also held managerial positions in the Customer Service and Marketing areas.

The Director of Regulatory Affairs holds a Masters degree in Economics from the University of Calgary.

Manager of Revenue Requirements

The Manager of Revenue Requirements joined FortisBC in 1989 and has also held positions in the Customer Service, Finance and Accounting areas.

The Manager of Revenue Requirements holds a Masters degree in Economics from the University of Alberta.

1.10 Please provide all emails, reports or any other documents created by anyone that may be relevant to the calculation of cost escalation for the project?

Response:

There was no calculation of cost escalation.

1.11 Please comment on whether or not the mitigation and control of "potential escalations" may include schedule acceleration, contracting, and/or hedging?

Response:

FortisBC agrees that mitigation of "potential escalations" could include altering project schedules or engaging contract resources. Both of these methods were used in the Kettle Valley Project.

While hedging is a possible alternative, FortisBC does not have the in-house expertise for this, nor does it feel that the additional cost of retaining internal or external resources would be in the best interest of customers.

2.0 Reference: Exhibit B-10, BCUC IR No. 1, 4.2.2

"…it was uncertain whether these escalations would be realized for the Kettle Valley Project…"

2.1 Please provide any certainty analysis that was done to support the statement in the above quoted response?

Response:

FortisBC did not complete a certainty analysis.

2.2 Please either confirm that no range analysis, including expected value or probability analysis, was done, or if done, provide all emails, reports or any other documents relevant to the development of range analysis regarding cost escalations?

Response:

FortisBC did not complete a range or probabilistic analysis.

2.3 Please comment on whether or not the ability to generate reliable project cost estimates is a critical function necessary to identify project risks and to support and evaluate project management decisions?

Response:

FortisBC agrees that reliable project cost estimates are helpful for evaluating and comparing alternate solutions to address an identified need. Once a determination is made on how to best to address that need, reliable project cost estimates are used to identify project risks and to evaluate project management decisions, however, at the same time, FortisBC also has an obligation to provide safe and reliable service to its customers. In the end, cost variances that result from circumstances beyond the Company's control may be necessary in order to meet this obligation to customers. Thus, while highly accurate cost estimates may provide greater certainty of the final cost of a project, this initial increased accuracy will not necessarily result in reduced final project costs or risks.

3.0 Reference: Exhibit B-10, BCUC IR No. 1, 4.5, Appendix 2.2, BCUC IR No. 1, 48.2, BCUC IR No. 1, 49.2.1

"The fibre cost used in the Kettle Valley Project CPCN application was $29,000 per km, … and was derived from the km cost incurred to install fibre between Pentiction and Oliver as a component of the South Okanagan project."

"Following is an order-of-magnitude estimate for a fibre-optic communication system between Oliver, Kettle Valley and Grand Forks. This is based on project and equipment costs from the South Okanagan and Kootenay 230 kV projects …"

"… actual costs incurred resulted in a construction cost of approximately 48,000 per km."

"FortisBC did not specifically identify the communication estimate as a "per kilometre cost" in the Kettle Valley Project CPCN."

3.1 Please confirm that the estimate in the CPCN application for fibre-optic communication work was based on the estimate found in Appendix 2.2?

Response:

FortisBC confirms that the estimate in the CPCN application for the fibre-optic communication work was based on the estimate found in BCUC IR1 Appendix 2.2 (Exhibit B-10).

3.2 Please provide all emails, reports or any other documents relevant to the decision to base the estimate in the CPCN application for fibre-optic communication work on the estimate found in Appendix 2.2?

Response:

The decision to base the CPCN Application on the estimate found in BCUC IR1 Appendix 2.2 occurred via informal discussions and meetings. No further documentation exists to support the decision.

3.3 Please define "an order-of-magnitude estimate"? Please provide all internal documents that define "an order-of-magnitude estimate"?

Response:

An order of magnitude estimate refers to the number of significant digits that are relevant in the estimate. FortisBC does not have internal documents that define an order of magnitude estimate.

3.4 Please comment on whether or not the estimate for fibre-optic communication work was based, at least in part, on the Kootenay 230 kV project?

Response:

The multiplexer equipment costs in the estimate were based on the Kootenay 230 kV Project.

3.5 Please provide the calculation of the $29,000 per km cost estimate for the fibre-optic communication work?

Response:

In 2004, as a component of the South Okanagan Reinforcement Project, approximately 40 km of fibre optic cable was installed on 40 Line and 76 Line. The resulting actual costs were $32,000 per kilometer of installed fibre. For the Kettle Valley Project CPCN Application, FortisBC reduced the per kilometre unit cost by approximately 10 percent in recognition of anticipated efficiency gains by incorporating the fibre installation into the project distribution line work scope, thus resulting in the $29,000 per kilometer estimate.

4.0 Reference: Exhibit B-10, BCUC IR No. 1, 4.5

"… FortisBC retained an external engineer to review, update, and seal the construction drawings."

"Project costs expended on the external surveying and engineering consultants to prepare an engineering package for construction was approximately $0.6 million."

"A portion of the variance for the construction expenditures were related to the required structure change-outs and modifications … with the remaining variance attributed to the escalated labour costs for external line contractors…"

4.1 Please identify or provide the service agreement used to retain the external engineer to review, update, and seal the construction drawings, and, if not the same, the service agreement used to retain the external surveying and engineering consultants to prepare the engineering package for construction?

Response:

Please also refer to ICG IR1 Appendix 4.1A and ICG IR1 Appendix 4.1B.

4.2 Please provide all the "Standard Request Form for Services" relevant to the project, including the "Standard Request Form for Services" relevant to the fibre-optic communication work?

Response:

The "Standard Request Form for Services" was issued by the Company in order to document the services required to be performed for the Company by the vendor performing the services. The Standard Request Form for Services was also used to validate invoices received for services rendered. Once an invoice was validated and paid, there is little value in collating the Standard Request Form for Services and they were simply filed by document number in the Accounts Payable records. In order for the Company to provide all the Standard Request Form for Services relevant to the project including the fibre-optic communication work, the Company estimates that it would have to retrieve about 140 file boxes from archives and review approximately 30,000 transactions to determine if a Standard Request Form for Services was issued for the transaction, and photocopy the relevant documents in response to this information request. The Company has estimated that it would take approximately 10 minutes per transaction in order to identify the transactions, retrieve the document, review the document and if appropriate photocopy the document. In order to accomplish this in a month, it would cost the Company approximately $125,000 (30,000 transactions times 10 minutes per transaction divided by 60 minutes per hour times $25 per hour).

As the Standard Request Form for Service are simply used to document the services to be performed by vendors for the Company, and to validate invoices for service received, the Company does not believe the requested information is relevant to the conduct of this prudency review for the Kettle Valley Project as the test for determining prudency involves consideration of the expenditures and decisions made in relation to the project. As such, and due also to the significant cost and effort required for this immaterial information, the Company declines to provide the requested information.

4.3 Please identify all payments to entities or consultants that signed a service agreement with FortisBC that were not within the scope of a "Standard Request Form for Services"?

Response:

For all contractors who signed a service agreement, the process required included the completion of a Standard Request Form. Please also see response to ICG IR1 Q4.2 above.

5.0 Reference: Exhibit B-10, BCUC IR No. 1, 4.1, Table dated May 17, 2006

"The table below indicates only a 20% increase for transformers. This is deceptive as FortisBC is currently experiencing across the board increases of 30% on most transformers."

"Lead times for distribution transformers average 30 weeks while power transformers average 1 year."

5.1 Please provide details to support the conclusion that "FortisBC is currently experiencing across the board increases of 30% on most transformers", such details should include the monthly trend line from the beginning to the end of the 30 month period of the analysis?

Response:

Due to the passage of time and employee changes since 2006, FortisBC has been unable to locate any supporting documentation for the conclusion cited above.

5.2 Please explain and provide detailed calculations of how the escalation analysis in the Table supports the use of an overall inflation rate of approximately 5% for most of its transmission, station and distribution sustaining projects?

Response:

It is unknown what formed the basis for the calculated 5 percent inflation rate in the 2007/08 CEP as it is not discussed further in the analysis. Due to the passage of time and employee changes since 2006, FortisBC has been unable to locate any supporting documentation.

5.3 Please comment on whether or not the basis of the estimate of the two Kettle Valley transformers was the price of the Waterford 24/32/40 MVA power transformer? If so, please explain and provide detailed calculations for how the price of the Waterford power transformer was escalated to the CPCN estimate for the two transformers?

Response:

FortisBC did base the estimate for the Kettle Valley transformers on the procurement of the Waterford transformer. In June 2005 FortisBC signed a contract with Pauwels Canada to purchase a 24/32/40 MVA, 63 kV/13 kV power transformer for the Waterford Substation. The contract price to supply the power transformer was $647,000. Given that the Kettle Valley transformers had the same power rating, but higher voltage ratings, the estimated price was escalated approximately 15 percent to $750,000.

5.4 Please comment on whether or not the price of the Kettle Valley transformers was used to estimate the price of any power transformers? If not, please explain why not?

Response:

At the time, FortisBC used previously procured transformers as a basis for transformer estimating, and thus would have considered the cost of the Kettle Valley transformers on future purchases.

5.5 Please comment on whether or not as of the date of the analysis, May 17, 2006, FortisBC was experiencing across the board increases greater than the increases shown for any other items on the table?

Response:

FortisBC has no further pricing information or analysis for any other items conducted on or around May 17, 2006.

5.6 Please confirm that the lead time of 1 year noted in the above quote applies to the transformers purchased for the Kettle Valley Substation?

Response:

The quoted lead time was a general statement derived from informal conversations with varying manufacturers and not specific to the Kettle Valley transformers.

5.7 Please provide any emails, reports or any other documents that are relevant to or refer to the "Materials Pricing Analysis" provided in response to BCUC IR No. 1, 4.1, including the request(s) for, and the circulation list of, the "Materials Pricing Analysis"?

Response:

FortisBC has conducted a search of available documentation and email records (including those of former employees) and has been unable to locate any other associated documents, other than the pricing analysis provided in response to BCUC IR1 Q4.1. Thus, due to the passage of time and employee changes since 2006, FortisBC has no records of any requests or circulation of the document to other individuals.

5.8 Please identify anyone who may have been aware of or received the "Materials Pricing Analysis" who was not identified on the circulation list requested in the previous question?

Response:

FortisBC has conducted a search of available documentation and email records (including those of former employees) and has been unable to locate any other associated documents, other than the pricing analysis provided in BCUC IR1 Q4.1. Thus, due to the passage of time and employee changes since 2006, FortisBC has no records of any requests or circulation of the document to other individuals.

6.0 Reference: Exhibit B-10, BCUC IR No. 1, 4.9 BCUC IR No. 1, 5.4.1; BCUC IR No. 1, 36.2.3

"The 5 percent value was an estimate based on recent purchases of stock material items."

"… the Kettle Valley Project internal reappropriation received executive approval on August 10, 2007."

"…once a consolidated re-forecasting of the Project costs was completed in April 2007, and subsequently reviewed by FortisBC's Executive during May 2007 …"

"As the Kettle Valley Project internal reappropriation has not been approved at that time, it was not incorporated into the preliminary submission."

6.1 Please provide all drafts and the final appropriation that received executive approval on August 10, 2007? Please provide all emails, reports or any other documents relevant to the "reappropriation" approval on August 10, 2007?

Response:

The re-appropriation was a working document created in a spreadsheet and thus any previous working drafts were overwritten during the development of the final re-appropriation. There were a number of internal discussions and telephone conversations for which there is no formal record. Please refer to Attachment 2.1b from BCUC Q2.1 (Exhibit A2-13) for a copy of the final re-appropriation.

6.2 Please comment on whether or not the reappropriation required board approval? Please provide all emails, reports or any other documents circulated to the board?

Response:

The re-appropriation did require board approval. Please see ICG IR1 Attachment 6.2.

Agenda Item 11 – Other Business

Explanatory Note

Agenda items added at the beginning of the meeting.

(a) Kettle Valley Variance:

The Board of Directors approved the 2007 and 2008 Capital Expenditure Plan on July 20, 2006 (the "Plan"). The amounts approved therein in relation to the Kettle Valley Substation Project (the "Project") were approximately $21.5 million. The new forecasted expenditures in relation to the Project are approximately $28.5 million.

This matter is brought forward as a matter of good governance and enables the Board of Directors to carry out its supervisory responsibilities.

Resolution

RESOLVED THAT:

1. The capital budget for the Kettle Valley Substation Project of $28.5 million be and is hereby approved; and

2. Any Officer of the Corporation is hereby directed to do and perform all acts and things and execute all documentation necessary to give effect to this resolution and all such acts or things be and are hereby approved.

6.3 Please provide all emails, reports and any other documents relevant to the executive review of the Project costs during May 2007?

Response:

Please refer to ICG IR1 Attachment 6.3.

Leclair, Mike

From: Sam, Doyle
Sent: June-19-07 5:15 PM
To: Frank, Edgar; Chernikhowsky, Paul; Smithson, Barry
Cc: Leclair, Mike; Klashinsky, Curtis
Subject: Kettle Valley

Just a heads up that I met with Mike on Monday to discuss the Kettle Valley project, in particular the current forecast. As a fall out of a current forecast which is $7M over the approved budget, I have asked Mike what we are doing to reduce this variance, up to and including scope reductions. doyle

6.4 Please confirm that the only comments relevant to project costs made by Mr. Don Debienne and Mr. Sam Doyle on the draft of the CPCN application were made by Mr. Doyle on page 3 of 47 of Appendix 17.1.b when Mr. Doyle said:

??Do we want (or can we) make the statement that this project makes sense irregardless of the Grand Forks voltage conversion ie and wouldn't be a stranded cost if the plan for the conversion is changed or not approved in the future?? Saw a note from Joyce that we will now incluide the East Boundary for approval as well???

And then again by Mr. Doyle at page 18 of 47 of Appendix 17.1.b when he said:

How does this total cost of 10.66M for fibre compare to other communication options? A bigger question $10M for communications is a lot of money, almost 50% of the total project costs – what is the value of this again as it doesn't come to the surface in this document. $8M with only the work communications after it raises a bunch of questions?.

Response:

Confirmed. The cited statements are the only comments of which FortisBC has a record with respect to the project costs.

6.5 Please confirm that neither Mr. Debienne nor Mr. Doyle made comments about the estimating methodology used in the project estimates on the CPCN application drafts?

Response:

Confirmed. FortisBC has no record of any comments related to the estimating methodology.

6.6 Please explain the comments made by Mr. Doyle at page 18 of 47 of Appendix 17.1.b?

Response:

The comments from Mr. Doyle [*sic*] were related to the cost and necessity of the fibre optic communications infrastructure justification and its relationship to the Kettle Valley project. The draft version of the CPCN application made reference to the cost of future fibre optic communications between Grand Forks and Trail which was not relevant or necessary for the

Kettle Valley Project. Hence, these future costs were removed from the final CPCN application submission.

6.7 Please provide any emails, reports or any other documents reviewed and/or prepared by either Mr. Debienne or Mr. Doyle regarding the estimating methodology used in the project estimates?

Response:

FortisBC has no record of any emails, reports or documents reviewed and/or prepared by either individual related to the estimating methodology used in the project estimates.

6.8 Please identify the executives that were involved with the review of the Project costs during May 2007, and identify the 2 Vice Presidents that attended the meeting with Commission staff in June 2007?

Response:

Relevant executives associated with approving the internal reappropriation would have reviewed the increased project forecast total cost; this would have included the VP of Engineering and Operations, the VP of Regulatory Affairs and the President/CEO.

FortisBC's Vice President of Engineering and Operations (Mr. Doyle Sam) and Vice President of Regulatory Affairs and General Counsel (Mr. David Bennett) attended the meeting with Commission staff in June 2007.

6.9 Please comment on whether or not the management of a cost estimate involves continually updating the estimate with the actual data as they become available, revising the estimate to reflect changes, and analyzing differences between estimated and actual costs? If so, please provide all updates and or revisions to the project estimates?

Response:

In general terms, updating cost estimates to include new information (in particular, actual or firm costs as they become available) is good practice. However, in the case of the Kettle Valley

Project, following the development of the project estimate for the CPCN in September 2005, there was no basis on which to update the cost estimates. No new information in terms of firm or actual costs was available until after the project was approved and firm contract bids were received in late 2006/early 2007. Only at that time was the project able to be meaningfully re-estimated based on updated pricing information. Following the development of the revised project estimate, the magnitude of the cost escalation compared to the original estimate became clear and hence FortisBC met with the Commission to discuss the new project forecast in June 2007.

Further, following the meeting with the Commission, FortisBC continued to update and manage the project cost estimate during construction with actual data as it became available. This is demonstrated by the fact that the quarterly progress reports filed indicated slight changes to the overall project forecast as the project proceeded and that the final project costs were within less than one percent of the updated estimate provided during the June 2007 meeting. The 2007 revised estimate and the final project costs at completion have been previously provided in the response to BCUC IR1 Q28.1 (Exhibit B-10).

7.0 Reference: Exhibit B-10, BCUC IR No. 1, 10.4.2, Handy Whitman Electric Index of Public Utility Construction Costs

7.1 Please prepare a table based on the Handy Whitman Index with escalations calculated for each line item on the "Materials Pricing Analysis" (see Exhibit B-10, BCUC IR No. 1, 4.1) for the period from January 2002 – January 2005?

Response:

Please see the table below. Please note, the cost trends provided in the Handy Whitman Index include both material and labour costs whereas the escalations provided in the response to BCUC IR1 Q4.1 pertain only to material costs.

Material Category from BCUC IR1 Q4.1	Handy Whitman Index Category	2002		2003		2004		2005
		Jan	Jul	Jan	Jul	Jan	Jul	Jan
Transformers	Line Transformers (Distribution)	247	250	252	257	248	267	278
Transformers	Pad Mounted Transformers (Distribution)	357	365	362	362	390	460	493
Cable	Overhead Conductors & Devices (Transmission)	416	406	411	412	419	445	463
Cable	Overhead Conductors & Devices (Distribution)	438	437	449	451	461	477	496
Poles	Poles and Fixtures (Transmission)	450	448	454	456	466	470	487
Poles	Poles, Towers & Fixtures (Distribution)	420	426	434	437	439	448	466
Insulators	*Refer to Overhead Conductors & Devices*							
Hardware	*Refer to Poles, Towers & Fixtures*							
Cable Accessories	*Refer to Overhead Conductors & Devices*							
Switches	Station Equipment (Transmission)	429	434	438	432	437	477	493
Switches	Station Equipment (Distribution)	391	383	388	387	394	444	461
Lighting Equipment	Street Lighting - Overhead	435	450	474	478	482	488	505
Generation Material	Water Wheels, Turbines & Generators	398	392	399	405	413	395	402
Meters	Meters Installed	263	275	287	287	324	324	311
Concrete Products and Enclosures	*Not explicitly identified in Handy Whitman Index*							

1 Note: (1973 = 100)

2
3

8.0 Reference: Exhibit B-10, BCUC IR No. 1, 10.5

"… this definition [contingency] excludes general escalation from contingency, but this is referring to general inflationary effects (such as those reflected in an increase in the Canadian CPI)."

8.1 Please provide the AACE International complete definition of "Contingency" and the definition of "Escalation"?

Response:

Following are the AACE International definitions as requested:

"CONTINGENCY - An amount added to an estimate to allow for items, conditions, or events for which the state, occurrence, and/or effect is uncertain and that experience shows will likely result, in aggregate, in additional costs. Typically estimated using statistical analysis or judgment based on past asset or project experience. Contingency usually excludes; 1) major scope changes such as changes in end product specification, capacities, building sizes, and location of the asset or project (see management reserve), 2) extraordinary events such as major strikes and natural disasters, 3) management reserves, and 4) escalation and currency effects. Some of the items, conditions, or events for which the state, occurrence, and/or effect is uncertain include, but are not limited to, planning and estimating errors and omissions, minor price fluctuations (other than general escalation), design developments and changes within the scope, and variations in market and environmental conditions. Contingency is generally included in most estimates, and is expected to be expended."

"ESCALATION - the provision in actual or estimated costs for an increase in the cost of equipment, material, labor,etc, over that specified in the purchase order or contract due to continuing price level changes over time."

8.2 Please provide any emails, reports or any other documents prepared prior to the filing of this information request relevant to the conclusion that escalation refers to "general inflationary effects" only?

Response:

The AACE criteria and specific definition of contingency were not considered relevant prior to the issuance of the 2010 CPCN Guidelines. As such, there are no emails, reports or other documents to provide with respect to this interpretation of contingency.

9.0 Reference: Exhibit B-10, BCUC IR No. 1, 13.7

"… reasonable increases in labour costs have been able to be managed within the confines of the estimate accuracy and contingency values."

9.1 Please comment on whether or not the accuracy (from 10% to 25%) of project cost estimates would have been improved if "reasonable increases in material and labour costs" were included in the project cost estimates?

Response:

If "reasonable increases in material and labour costs" were included in the initial project cost estimates, it is plausible that the initial project estimate would have been higher and thus closer to, but still significantly below, the final project cost. Further, what is not established is whether this increased effort would have resulted in a decreased final project cost. In fact, the effort expended in conducting market analyses and similar studies to determine appropriate inflation factors would have resulted in additional labour costs (and potentially external consultant charges) prior to filing the CPCN application and thus increased the total project cost.

10.0 Reference: Exhibit B-10, BCUC IR No. 1, 19.5; Exhibit B-10, BCUC IR No. 1, 22.3.1

"… however, due to the length of the intervening interval personnel had to re-familarize themselves with project details …"

"…FortisBC has attributed approximately $0.31 million of the project cost variance to the regulatory delay."

10.1 Please provide the bookend dates for the "intervening interval"?

Response:

Based on the regulatory timetable established in Order G-115-05, the expected regulatory process would have concluded in March 2006. The bookends for the extended intervening process are then approximately April 2006 to August 2006.

10.2 Please provide details of all payments for work done during the "intervening interval" to the external resources that needed to re-familarize themselves with project details?

Response:

The payments to the consultants over the extended intervening interval of April to August 2006 are listed below. Payments for services rendered lagged a minimum of one month behind, therefore the payment schedule below lists payments from May to September 2006. FortisBC submits that the costs provided below do not represent re-familiarization efforts but rather external engineering effort during the extended intervening interval. As noted in the response to BCUC IR1 Q19.5.1, the engineering expenditures associated with the re-familiarization were captured as a part of the total project engineering expenditures. As such, it is not possible to give a specific approximation of what the costs of the re-familiarization were.

Consultant	Function	May, 2006	Jun, 2006	Jul, 2006	Aug, 2006	Sep, 2006
EMCO	Project Engineering	$4,469.40	$4,146.61	3311.27		$4,592.25
MCW	Station Engineering	$218,522.49		$68,589.87	$93,435.99	
SCL	Protection Engineering		$380.00	$760.00	$1,710.00	$3,610.00

10.3 Please comment on whether or not the regulatory delay resulted in higher costs for the two transformers?

Response:

The power transformers were purchased following CPCN approval for a cost of $2.69 million, which represents a $0.59 million incremental cost increase as compared to the lowest bid received in the December 2006 tender.

10.4 Please also comment on whether or not the regulatory process was relevant to the decision to not include the two transformers with the January 2006 bid?

Response:

The Kettle Valley power transformers were included in a tender along with several other power transformers that were identified in the 2005 System Development Plan in November 2005.

The tender specified an expedited delivery for the Kettle Valley transformers to best align with the construction milestones in the CPCN application. Bids for the transformers were received in December 2005 and evaluated through January 2006. The lowest bid for the Kettle Valley transformers totaled $2.1 million (as compared to an estimate of $1.5 million included in the CPCN application). Following the evaluation, the Company contacted the Commission to inquire as to the status of the CPCN Application and whether the bid for the transformers could be awarded prior to CPCN approval. It was at this point the Commission advised the Company that they were contemplating additional regulatory process for review of the Application. In recognition of the uncertainty and ongoing approval process, the Kettle Valley transformers were not included in the contract awarded in January 2006.

11.0 Reference: Exhibit B-10, BCUC IR No. 1, 22.3.2, BCUC IR No. 1, 47.3

"… FortisBC did not prepare … any form of probabilistic estimate for the project."

"…there was nothing wrong with the Kettle Valley estimate…"

"… common principles applicable to projects … do not need to be explicitly communicated to the Commission…that capital projects have cost risks would be one of those common principles."

11.1 Please confirm that prior to the year 2005 and as early as the mid-90s FortisBC prepared probabilistic estimates for some projects and for the analysis of power purchase expenses?

Response:

Probabilistic estimating methods have been used in some cases for the estimation of power purchase expense. The Company has reviewed its internal electronic project records back to 2002 and BCUC publicly-available information and has not identified any capital projects for which probabilistic estimation was used prior to 2005.

11.2 Please confirm that BC Hydro routinely prepares probabilistic estimates for projects, and did so prior to the revisions to the CPCN Guidelines regarding AACE estimates?

Response:

Unlike FortisBC, BC Hydro Transmission Engineering has an in-house estimating group that has the expertise and software tools to conduct probabilistic analyses of project contingency cost estimates. Given that large investment, BC Hydro has the resources to produce probabilistic project estimates and routinely does so for larger projects or those with unusual risks. This was in place prior to the 2010 revisions to the CPCN Guidelines regarding AACE estimates. However, the fact that BC Hydro also encounters variances in completed projects indicates that probabilistic estimating does not always result in increased cost certainty.

11.3 Please confirm that the CPCN Guidelines in place at the time of the Kettle Valley CPCN application did not prevent utilities from preparing probabilistic estimates for projects?

Response:

The CPCN Guidelines in place at the time of the Kettle Valley CPCN application were not prescriptive of the estimating methodology to be used in project estimates. The only requirement was that the application was to include “a description of any new or expanded public works, undertakings or infrastructure that will be entailed by the project, together with an estimate of the costs and necessary completion dates”.

11.4 Please confirm that estimating methodology for utility projects frequently included probabilistic estimates at the time the Kettle Valley Substation CPCN application was filed?

Response:

FortisBC considers it plausible that at least some utilities used probabilistic estimating methods at the time of the Kettle Valley Project CPCN application. However, the Company is not aware of any information source that would reveal how frequently the method is used amongst all possible electric utilities, in particular those that would be comparable to FortisBC.

11.5 Please comment on whether or not market volatility for materials and labour at the time of the CPCN application was relevant to assessing the cost risk to the project?

Response:

At the time of development of the cost estimate for the Kettle Valley Project (mid 2005), FortisBC was only seeing initial indications of price escalation and increasing volatility. It is unrealistic to expect FortisBC at that time to extrapolate from those initial indications and predict the market turmoil that was to occur over the ensuing years. Instead, in accordance with the successful past practice and experience, it was reasonable, at the time of the Kettle Valley Project CPCN, for FortisBC to adhere to the same scoping, planning and estimating methodologies that had historically been used in previous CPCNs submitted to, and approved by, the Commission.

11.6 If so, please comment on whether or not FortisBC ought to have "explicitly communicated to the Commission" the increase in cost risk to the project given market volatility for materials and labour?

Response:

At the time of development of the cost estimate for the Kettle Valley Project (mid 2005), FortisBC was only seeing initial indications of price escalation and increasing volatility. It is unrealistic to expect FortisBC at that time to extrapolate from those initial indications and predict the market turmoil that was to occur over the ensuing years. Instead, in accordance with the successful past practice and experience, it was reasonable, at the time of the Kettle Valley Project CPCN, for FortisBC to adhere to the same scoping, planning and estimating methodologies that had historically been used in previous CPCNs submitted to, and approved by, the Commission.

It was not until 2007 (at which time the project was re-estimated based on new pricing information following the receipt of firm contract bids) that the full extent of the potential cost escalation was evident and there was no further opportunity for FortisBC to mitigate the escalation. It was then that FortisBC met with the Commission to discuss the new project forecast in June 2007.

11.7 Please provide any emails, reports or any other documents relevant to the interpretation and application of historical costs used to estimate the project estimates?

Response:

FortisBC has previously provided the information available on the project cost estimates (please refer to BCUC IR1 Q2.1). FortisBC does not have any further emails, reports or any other documents relevant to the interpretation and application of historical costs used to develop the project estimates. As noted in that IR response, this is primarily due to the passage of time and employee changes since 2005.

12.0 Reference: Exhibit B-10, BCUC IR No. 1, 22.3.3

"… the majority of the cost increases in project components were triggered by unforeseen increases in commodities and labour, all of which became apparent following completion of the detailed engineering design…"

12.1 Please identify the completion date of the detailed engineering design?

Response:

Detailed engineering concluded, signified by issuance of the final construction package, for the various project components on the following dates:

- Substation: June 2007
- Distribution: April 2009
- High Speed Communication: July 2007

Following the detailed engineering stage, engineering then focussed efforts on construction support, quality assurance, and production of as-built drawings.

12.2 Please explain how, when and by whom it "became apparent" that there were increases in commodities and labour components of the project?

Response:

In late 2006 and early 2007 there was a general awareness across engineering, project management and procurement staff of possible cost increases to the project given other concurrent work at the time. It was not until May 2007, when detailed engineering neared completion and firm costing for a portion of the equipment and construction contracts were known, that the Company realized the full impact of the commodity and labour increases.

12.3 Please provide all emails, reports or any other documents that followed completion of the detailed engineering design that are relevant to increases in commodities and labour components of the project?

Response:

Following the completion of the detailed engineering, there is no documentation relating to the labour and commodity increases aside from the thirteen quarterly Progress Reports filed with the BCUC.

13.0 Reference: Exhibit B-10, BCUC IR No. 1, 24.7

"The Commission had also not imposed a cost cap on the project."

13.1 Please confirm that FortisBC would have sought a variance of the Order or an amended CPCN if the Commission had imposed a cost cap on the project?

Response:

Without knowledge of the conditions which the Commission may have attached to a cost cap on the Project, FortisBC is unable to determine whether it would have in fact sought a variance of the approval order.

13.2 Please confirm that by June 2007 it was too late for FortisBC to make project management decisions to mitigate and/or control the increases in commodities and labour costs that resulted in the cost variance from the estimates provided in the CPCN application?

Response:

Not confirmed. As previously detailed in the response to BCUC Q10.1.1 (Exhibit A2-13), at the time FortisBC met with Commission staff on June 20, 2007 to apprise them of the expected increase in project expenditures, committed costs relating to the Kettle Valley Project totaled approximately $8 million of which approximately only 25 percent represented stranded costs (i.e. labour or equipment that could not be redeployed elsewhere in the system). Had the Commission suggested further regulatory process was required, or that alternative actions

should be taken, the remaining forecast project expenditures of approximately $20 million, as detailed in the updated cost estimate provided to the Commission on June 20, 2007, could have been delayed until the Commission's concerns were addressed.

The direction provided to FortisBC at the time was to mitigate and control costs wherever possible. This was accomplished primarily by tendering significant project components to a competitive bid process to manage costs. All material purchased for the project was competitively sourced. Construction and labour contracts were competitively bid or retained through existing contracts to obtain the most competitive price reflecting fair market value. The power transformers were purchased under a variable commodity clause which resulted in a net savings of $0.12 million as compared to the lowest fixed price alternative. In addition, the Company procured previously owned fibre for the communication build to further reduce costs.

14.0 Reference: Exhibit B-10, BCUC IR No. 1, 26.3

"The magnitude of the total increase was unforeseen at the time of the CPCN application submission."

14.1 Please comment on whether or not the decision to increase internal labour costs was justified based on market increases in labour costs? If so, please comment on whether or not the market increases in labour costs were foreseeable at the time the CPCN application was submitted?

Response:

Effective February 1, 2008 the Company awarded an interim market adjustment of 8 percent to the Powerline Technician Trades. This interim market adjustment was awarded to address the retention and attraction concerns in light of the escalated market conditions for this trade in both British Columbia and Western Canada, and thus was justified to retain the necessary skilled resources to operate and maintain the electrical system. This unforeseeable increase would not have been known at the time of the CPCN Application; however the impact of the increase would have impacted each option similarly and thus would not have influenced the option analysis.

15.0 Reference: Exhibit B-10, BCUC IR No. 1, 36.3

"Given the rise in commodities and market instability between the Application submission in October 2005 and the tender award in October 2006, it was reasonable to

assume that the manufacturers were overpricing the commodity risk. In an effort to achieve the lowest possible cost for the power transformers the Company accepted a variable commodity clause."

15.1 Please provide all emails, reports or any other documents that are relevant to the decision to accept a variable commodity clause?

Response:

Please refer to ICG IR1 Attachment 15.1.

From: Pfeifer, Gavin
To: Dufour, Pierre; Ciocoiu, Lucian
Cc: Lee, Chuck
Subject: FW: Kettle Valley Transformer
Date: Wednesday, September 06, 2006 3:13:03 PM
Attachments: Kettle Valley Price Comparison.xls
GE KettleValley.pdf
Pauwels Kettle Valley Aug 2006.doc

Hi Pierre,

Pauwels has been notified of their winning bid for the Kettle Valley transformers. To complete the addendum to the agreement we need to take a look at the two pricing strategies Pauwels has presented to us.

To summarize the two options:

1.) Lump sum price of $1,565,000 each – no changes to this price allowed even if substantial changes to commodity prices occur
2.) Lump sum price of $ 1,320,000 each – changes allowed subject to an adjustment of commodity prices. Please refer to the first sheet of the attached spreadsheet for a breakdown of the escalation formula.

As you can see from my analysis, even if commodity prices increased by 50%, the escalated price would still be $80,000 less (each) than the no change allowed price. If commodity prices increase by 25% the savings per transformer over the no change price would be $162,500 per transformer.

The probable time frame between the Pauwels quote and the actual ordering of the commodities will probably be six months. The commodities pricing would have to increase approximately 75% during that time frame for the two prices to coincide.

The only commodity of the three traded on the NYMEX is copper; at present, the six month futures market for copper appears to be stable. (Note: I am not a commodities analyst…for the amount of dollars involved, it may be worthwhile to obtain the opinion of an expert.)

Given the above, my recommendation is to go with the commodity based pricing at $1,320,000.00

Comments?

Regards,

Gavin Pfeifer
FortisBC Inc.
Coordinator, Purchasing & Contracts
1628 Dickson Ave.
Kelowna, BC V1Y 9X1
(250) 469 8034
fax (866) 639 4055
cell (250) 212-8154

From: Pfeifer, Gavin
Sent: Friday, August 18, 2006 3:22 PM
To: Dufour, Pierre; Archambault, Bob; Ciocoiu, Lucian
Subject: Kettle Valleu Transformer

Hi,

Attached is GE's and Pauwels re-evaluation of the Kettle Valley Transformer tender along with an updated spreadsheet comparing GE's and Pauwels quotes. GE's eps must be down this year…it looks

like they are trying to boost it with one sale.

The load loss figures in the spreadsheet are from the original quote; please recalculate for these new quotes and advise.

Thanks,

Gavin Pfeifer
FortisBC Inc.
Coordinator, Purchasing & Contracts
1628 Dickson Ave.
Kelowna, BC V1Y 9X1
(250) 469 8034
fax (866) 639 4055
cell (250) 212-8154

15.2 Please provide details of the price the manufacturers were willing to accept with and without the variable commodity clause?

Response:

Please refer to ICG IR1 Appendix 15.2A and 15.2B.

16.0 Reference: Exhibit B-10, BCUC IR No. 1, 39.2, 39.2.1

"Yes, at the time of the Application, it was reasonable to assume the highway corridor was acceptable…"

"In Section 5 of the MoTI Utility Manual, MoTI establishes the requirements for pole placements…"

16.1 Please confirm that Technical Bulletins are used by MoTI prior to a major update of the Transport of Canada Road Design Guide to assist designers and provide notice of pending changes to the Guide?

Response:

FortisBC confirms that traffic and electrical technical information, including changes to standards, safety notices and traffic controller information are distributed by the Ministry as Technical Bulletins. FortisBC also notes that previous to 2007, there is no technical bulletin listing the pending changes to the 2007 Transport of Canada Road Design Guide. FortisBC also notes that it incorrectly referred to the name of the 2007 guide, which is in fact named the *BC Supplement to TAC Geometric Design Guide*, 2007 edition.

16.2 Please identify and file all Technical Bulletins reviewed by FortisBC prior to the filing of the CPCN application?

Response:

In general, the Technical Bulletins are reviewed by the appropriate engineering and design personnel over the course of detailed design. However, for the purpose of the Kettle Valley Project CPCN Application, the Technical Bulletins were not reviewed as the detailed design had not started. FortisBC submits that its decision to wait until CPCN approval was received prior to committing further expenditures for the completion of the detailed engineering (including all possible external permitting requirements) was reasonable and prudent, and was consistent with successful past practice. FortisBC did not know in advance of the decision that the CPCN

would be approved and to do more engineering (and thus incur additional costs) in anticipation of a favourable outcome would have been an unjustified departure from FortisBC's successful past practice.

16.3 Please identify and file any guidelines or instructions published by MoTI that were reviewed by FortisBC prior to filing the CPCN application and that were relevant to the project?

Response:

In general, the guidelines or instructions published by MoTI are reviewed by the appropriate engineering and design personnel over the course of detailed design. However, for the purpose of the Kettle Valley Project CPCN Application, the guidelines or instructions published by MoTI were not reviewed as the detailed design had not started. Based on FortisBC's long history of line construction in MoTI corridors and the nearly 1,000 km of existing overhead distribution infrastructure in MoTI corridors, it was reasonable to assume the use of the highway corridor. Please also see response to ICG IR1 Q16.2 above.

16.4 Please file the sections of the MoTI setback guidelines in the Guide effective at the time of the CPCN application and in the 2007 Guide granting discretion to MoTI personnel to issues setback variances?

Response:

The guide effective at the time of the Kettle Valley Project CPCN Application was the BC Utility Policy Manual (see ICG IR1 Attachment 16.4A). The section applicable to setback variances is highlighted in yellow. The relevant sections in the BC Supplement to TAC Geometric Design Guide, 2007 edition are highlighted in yellow in ICG IR1 Attachment 16.4B.

UTILITY MANUAL

Subject: 5.3 Clear Zone

Policy

1. **Conformance with Clear Zone Standards.** Above-ground installations must conform with the Clear Zone standards when:

   - New above-ground utilities are being installed;
   - An existing utility line is being rebuilt or replaced; and,
   - Utilities are being relocated as part of new highway construction or major upgrading of an existing highway.

2. **Other Remedies.** Other design measures may be acceptable in situations where Clear Zone standards cannot be achieved.

3. **The Clear Zone Does Not Over-ride Other Standards.** The Clear Zone standard is one of several standards related to the location of utilities within the highway right-of-way. Conformance with Clear Zone requirements does not eliminate the need to conform with other standards.

Background to Policy

Clear Zone standards are set out in Section B.1.1 of the Ministry's *Highway Design Manual*. Under that standard, a defined area beyond the pavement edge must be kept clear of all above-ground obstacles including poles, guy lines, and other above ground facilities.

Utilities may be permitted to install facilities within the Clear Zone if they are adequately protected by barriers or other measures. The following design options might be considered (the list is presented in descending order of preference and effectiveness):

1. *Remove the obstacle or redesign it so it can be safely traversed;*
2. *Relocate the obstacle to a point where it is less likely to be struck;*
3. *Reduce accident severity with an appropriate breakaway device; and,*
4. *Redirect the vehicle by shielding the obstacle with a traffic barrier and/or crash cushion.*

Source: *Highway Design Manual* Ministry of Transportation and Highways

Table 620.A Suggested (¥) Design Clear Zone Distances (see note 1) in metres For New Construction and Reconstruction Projects on Rural Highways (¥¥)

Design Speed (km/h)	Design Year AADT (see note 2)	Front Slopes (Fill)			Back Slopes (Cut) (see note 4)		
		6:1 or flatter	5:1 to 4:1	3:1	3:1	5:1 to 4:1	6:1 or flatter
< 70	200 <AADT< 750 (see note 3)	2.0 – 3.0	2.0 – 3.0	**	2.0 – 3.0	2.0 – 3.0	2.0 – 3.0
	750 - 1500	3.0 – 3.5	3.5 – 4.5	**	3.0 – 3.5	3.0 – 3.5	3.0 – 3.5
	1501 - 6000	3.5 – 4.5	4.5 – 5.0	**	3.5 – 4.5	3.5 – 4.5	3.5 – 4.5
	> 6000	4.5 – 5.0	5.0 – 5.5	**	4.5 – 5.0	4.5 – 5.0	4.5 – 5.0
70 - 80	200 <AADT< 750 (see note 3)	3.0 – 3.5	3.5 – 4.5	**	2.5 – 3.0	2.5 – 3.0	3.0 – 3.5
	750 - 1500	4.5 – 5.0	5.0 – 6.0	**	3.0 – 3.5	3.5 – 4.5	4.5 – 5.0
	1501 - 6000	5.0 – 5.5	6.0 – 8.0	**	3.5 – 4.5	4.5 – 5.0	5.0 – 5.5
	> 6000	6.0 – 6.5	7.5 – 8.5	**	4.5 – 5.0	5.5 – 6.0	6.0 – 6.5
90	200 <AADT< 750 (see note 3)	3.5 – 4.5	4.5 – 5.5	**	2.5 – 3.0	3.0 – 3.5	3.0 – 3.5
	750 - 1500	5.0 – 5.5	6.0 – 7.5	**	3.0 – 3.5	4.5 – 5.0	5.0 – 5.5
	1501 - 6000	6.0 – 6.5	7.5 – 9.0	**	4.5 – 5.0	5.0 – 5.5	6.0 – 6.5
	> 6000	6.5 – 7.5	8.0 – 10.0*	**	5.0 – 5.5	6.0 – 6.5	6.5 – 7.5
100	200 <AADT< 750 (see note 3)	5.0 – 5.5	6.0 – 7.5	**	3.0 – 3.5	3.3 – 4.5	4.5 – 5.0
	750 - 1500	6.0 – 7.5	8.0 – 10.0*	**	3.5 – 4.5	5.0 – 5.5	6.0 – 6.5
	1501 - 6000	8.0 – 9.0	10.0 – 12.0*	**	4.5 – 5.5	5.5 – 6.5	7.5 – 8.0
	> 6000	9.0 – 10.0*	11.0 – 13.5*	**	6.0 – 6.5	7.5 – 8.0	8.0 – 8.5
≥ 110	200 <AADT< 750 (see note 3)	5.5 – 6.0	6.0 – 8.0	**	3.0 – 3.5	4.5 – 5.0	4.5 – 5.0
	750 - 1500	7.5 – 8.0	8.5 – 11.0*	**	3.5 – 5.0	5.5 – 6.0	6.0 – 6.5
	1501 - 6000	8.5 – 10.0*	10.5 – 13.0*	**	5.0 – 6.0	6.5 – 7.5	8.0 – 8.5
	> 6000	9.0 – 10.5*	11.5 – 14.0*	**	6.5 – 7.5	8.0 – 9.0	8.5 – 9.0

(¥) The designer may use lesser values than the suggested distances in this table only if these lesser values are justified using a cost-effectiveness analysis as outlined in section 620.07. The Design Clear Zone Inventory form in Figure 620.B must be filled-in by the designer and included in the design folder.

(¥¥) Rural highways are typically open ditch. Urban highways typically have curb and gutter with enclosed drainage. Refer to section 620.12 for a discussion of Clear Zone applied to an urban environment.

(*) Clear zones may be limited to 9.0 metres for practicality and to provide a consistent roadway template if previous experience with similar projects or designs indicates satisfactory performance.

(**) Since recovery is less likely on the unshielded, traversable 3:1 slopes, fixed objects should not be present in the vicinity of the toe of these slopes. Recovery of high-speed vehicles that encroach beyond the edge of the shoulder may be expected to occur beyond the toe of slope. Determination of the width of the recovery area at the toe of slope should take into consideration right-of-way availability, environmental concerns, economic factors, safety need and collision history. Also, the distance between the edge of the through travel lane and the beginning of the 3:1 slope should influence the recovery area provided at the toe of slope. While the application may be limited by several factors, the foreslope parameters which may enter into determining a maximum desirable recovery area are illustrated in Figure 620.A.

Notes:

1. All distances are measured from the outer edge of the through traveled lane. Where a site specific investigation indicates a high probability of continuing crashes, or such occurrences are indicated by crash history, the designer may provide clear zone distances greater than the clear zone shown in Table 620.A.
2. For clear zones, the "Design Year AADT" will be total AADT for both directions of travel for the design year. This applies to both divided and undivided highways.
3. For AADT≤200, the front slope is 2:1 or flatter, the back slope is 1.5:1 or flatter. The setback to fixed objects is the greater of the following two distances: - 4.0 m from the outside edge of the traveled lane or - 2.0 m from the lowest ditch point.
4. The values for "back slopes" only apply to a section where the toe of the slope is adjacent to the shoulder (enclosed drainage).
5. The values in the table apply to tangent sections of highway. Refer to Table 620.B for adjustment factors on horizontal curves.
6. Refer to the TAC Geometric Design Guide for Canadian Roads for worked examples of calculations.

16.5 Please file Section 5 of the MoTI Utility Manual and provide references to subsections that FortisBC relied upon to assume it would receive a setback variance?

Response:

Section 5 of the BC Utility Manual can be found as ICG IR1 Appendix 16.5 with the applicable exception policy highlighted in yellow. Further, FortisBC notes it also relied on its extensive history of building in MoTI corridors over the years and the fact that variances that were granted for those previous projects.

17.0 Reference: Exhibit B-10, BCUC IR No. 1, 40.3, Price Activity for Key Raw Materials

"the unprecedented commodities price increase during the 2006-2007 period when material order and construction actually occurred could not reasonably have been foreseen."

"the commodities futures forecast for relevant commodities commonly used in utility construction were forecast to decrease. The table below provides a commodities futures forecast for copper available on the date of he CPCN submission (October 11, 2005)."

17.1 Please present in tabular format the data points in the "Price Activity for Key Raw Materials" graph.

Response:

FortisBC is unable to provide the data points for the "Price Activity for Key Raw Materials" graph as the graph was provided to FortisBC without data points by ABB.

17.2 Please confirm that copper prices increased by over 200% in the four year period ending September 30, 2005?

Response:

Not confirmed. FortisBC notes the price per pound of copper, supplied by Pro Purchaser, as of October 1, 2001 was $1.18 CAD and the price as of October 1, 2005 was $2.09 CAD. This represents an approximate 77 percent increase over the specified 4 year period.

17.3 Please confirm that an all-time high copper price was achieved just 2 weeks, the last week of September 2005, before the filing of the CPCN application?

Response:

Not confirmed. FortisBC notes that the price per pound for copper on September 1, 2005 was $2.07 and on October 1, 2005 the price rose to $2.09 per pound. FortisBC also notes that the "all-time high copper price" was set on February 7, 2011 at $4.63 per pound.

18.0 Reference: Exhibit B-10, BCUC IR No. 1, 47.3

"…there was nothing wrong with the Kettle Valley estimate…"

18.1 Please comment on whether or not in circumstances of price volatility probabilistic estimating is a better estimating practice than is deterministic estimating?

Response:

The Kettle Valley Project estimate developed by FortisBC was deterministic however it also had an associated probabilistic accuracy range; this is evident by the fact that the estimate contained accuracy ranges (±25 percent and ±10 percent) and was not simply a single number. These accuracy ranges inherently imply that there was an uncertainty in the estimate and that the actual cost was expected to be within some probability distribution of the forecast cost.

FortisBC considers that in some circumstances making using of probabilistic estimating methods such as Monte Carlo analysis, while more complex and thus more costly, could produce more accurate cost estimates.

However, at time of development of the cost estimate for the Kettle Valley Project (mid 2005), FortisBC was only seeing initial indications of price escalation and increasing volatility. It is unrealistic to expect FortisBC at that time to extrapolate from those initial indications and predict the market turmoil that was to occur over the ensuing years. Instead, in accordance with the successful past practice and experience, it was reasonable, at the time of the Kettle Valley Project CPCN, for FortisBC to adhere to the same scoping, planning and estimating methodologies that had historically been used in previous CPCNs submitted to, and approved by, the Commission.

19.0 Reference: Exhibit B-10, BCUC IR No. 1, 48.4.2

"… detailed engineering identified the need for twelve structure change-outs."

19.1 Please explain why remediation of existing structures did not address the identified "need for twelve structure change-outs."

Response:

The previous tender package, which was based on a preliminary-level field survey, did not identify the need for any structure replacements. The package did identify several areas where construction crews were required to confirm clearances at time of construction, but it was expected that any clearance concerns identified during construction could be remediated on the existing structures. The final design was based on approximately 100 spans of detailed survey information. The survey information was then used to prepare a 3D PLS-CADD computer-aided model of the transmission line, which identified a number of structural concerns that ultimately drove the structure replacements.

20.0 Reference: Exhibit B-10, BCUC IR No. 1, 48.5

"…FortisBC retained an external consultant to review the existing fibre installation design package."

20.1 Please identify who prepared the "existing fibre installation design package", and explain why and when was it prepared?

Response:

The initial tender design package, completed by FortisBC in 2002, involved the installation of fibre-optic cable on 182 kilometres of transmission line between Penticton and Trail. The package was prepared at the request of a third party who was contemplating a fibre-optic build between Penticton and Trail. The package was completed by FortisBC Engineering with assistance from an external engineering consultant.

20.2 Please file the service agreement with the external consultant that was retained to review the existing fibre installation design package?

Response:

Please see response to ICG IR1 Q4.1 above.

21.0 Reference: Exhibit B-10, BCUC IR No. 1, 48.7

"FortisBC had multiple internal technical staff review the fibre cost estimate prior to submitting the CPCN Application."

21.1 Please confirm that the external consultant was a qualified expert for the design of, and cost estimates, for fibre-optic communications?

Response:

As noted in the response to BCUC IR1 Q48.5, the external consultant was engaged in November 2006 (subsequent to the CPCN decision), and was engaged only to review, update, and seal the previous fibre optic installation design. FortisBC confirms that this external consultant was qualified to prepare the design for the fibre optic installation component of the Project. This external consultant was not engaged to prepare or review a cost estimate for the fibre optic installation component.

21.2 Please provide all emails, reports or any other documents from the external consultant relevant to the fibre cost estimate provided in Appendix 2.2 of Exhibit B-10?

Response:

Please see the response to ICG IR1 Q21.1 above.

21.3 Please confirm that the internal technical staff did not have the expertise required to complete the design and estimate for the fibre-optic communications work? If not confirmed, please file detailed CVs for every internal technical staff that prepared the design and estimate for the fibre-optic communications work?

Response:

Not confirmed. Please refer to the response to ICG IR1 Q1.9 above.

22.0 Reference: Order G-195-10; FortisBC 2012-2013 RRA and 2012 ISP Proceeding, Exhibit B-1, Appendix N

"FortisBC to provide information, in its next revenue requirements application, on how it plans to narrow the variance between approved and actual capital expenitures to ensure that rates charged to customers and the return received by shareholders are both fair and equitable."

22.1 Please confirm that the Commission concern regarding the variance between approved and actual capital expenditures expressed in Order G-195-10 relates, at least in part, to the ability of FortisBC to create credible cost estimates of capital expenditures?

Response:

Not confirmed. FortisBC does not believe the concern regarding the variance between approved and actual capital expenditures expressed by the Commission in Order G-195-10 relates to the ability of FortisBC to create credible cost estimates of capital expenditures, nor the ability of FortisBC to establish a reliable process to create credible cost estimates of capital expenditures. Were the Commission concerned with the credibility of FortisBC's capital expenditure estimates (and the processes used to create those estimates), the Company expects that it would have explicitly identified this concern in its decision that approved the 2011 Capital Plan. That the proposed expenditures were approved by G-195-10, by extension, means the Commission has accepted the estimates (and the processes used to determine those estimates) for rate making purposes and found them credible.

The concern identified by the Commission in Order G-195-10 expressly related to narrowing the variance between approved and actual capital expenditures in order to ensure that the rates charged to customers and the return received by the shareholder are both fair and equitable. These variances can be the result of a shift in project timing, which can result from approval and permitting delays (particularly for greenfield construction), however the resulting variance is a product of this shift in project timing, and not the accuracy of estimating for the project expenditures. Furthermore, the desire expressed by the Commission to narrow variances between approved and actual capital expenditures does not preclude variances occurring as a result of the processes used to determine expenditure estimates, particularly where circumstances beyond the Company's control are encountered.

The discussion provided by the Company in Appendix N of its 2012-2013 Revenue Requirements Application addressed the issue of variances between approved and actual expenditures, and included a discussion of some of the causes of these variances, particularly

as related to the unforeseen and dramatic volatility in labour and commodity pricing experienced in recent years, as well as the impact of approval and permitting delays on project timing. Indeed, it is the Company's expectation that variances resulting from these factors are likely to be minimized going forward as market pricing for labour and commodities appears to have stabilized from the escalated levels experienced in recent years, as well as a result of the Company's continued efforts to mitigate shifts in project timing resulting from approval and permitting delays (particularly as evidenced by the successful and timely execution of the Benvoulin and Ootischenia substation projects).

22.2 Please confirm that the Commission concern regarding the variance between approved and actual capital expenditures expressed in Order G-195-10 related, at least in part, to the ability of FortisBC to establish a reliable process to create credible cost estimates of capital expenditures?

Response:

Please refer to the response to ICG IR 1 Q22.1 above.

22.3 Please provide all emails, internal reports or any other internal documents that revise or update the FortisBC estimating methodology since the date of Order G-195-10?

Response:

In March 2010, the BCUC issued Order G-50-10 which directed that CPCN applications filed after that date should be of the form that satisfied the requirements of the attached "2010 Certificates of Public Convenience and Necessity Application Guidelines". In those guidelines it was specified that cost estimates for project evaluation purposes should be prepared to an AACE Class 4 degree of accuracy and that an estimate for the recommended option should be prepared to an AACE Class 3 degree of accuracy. Soon after the release of that decision (and well in advance of Order G-195-10), FortisBC chose to update its internal estimating practices to better align with the AACE guidelines. This updated estimating methodology was to be used for all capital projects – not just CPCN applications.

Attached are relevant emails and documents associated with this process.

- ICG IR1 Appendix 22.3A – Email dated June 28, 2010

- ICG IR1 Appendix 22.3B – Email dated July 13, 2010
- ICG IR1 Appendix 22.3C – Excerpt from FortisBC 2012 Integrated System Plan
- ICG IR1 Appendix 22.3D – FortisBC Transmission and Distribution Estimating Guidelines

FORTISBC

CHANGE ORDER (CO) # 3

Project: 95020404
Project Title: Kettle Valley Fibre
Contract: LCD06040
Contractor: SNC-Lavalin ATP Inc.

Approved Effect on cost : See attached Schedule "D" - Payment
Approved Effect on Schedule: See attached Schedule "B" – Scope of Work.
Approved Change Description: The Contractor shall perform the Work herein described in the attached Project Package: a) Schedule "B" Scope of Work b) Schedule "D" Payment and Progress c) Schedule "E" Assigned Personnel d) Schedule "F" Attachments and Reference Documents All Agreement terms and conditions remain in full force and effect.
Reasons/Justification: See attached Project Package
Benefits to FortisBC : See attached Project Package
Contractor **Prepared by : _____** **Approved by : _____** **Date : _____** **Date : _____**
FortisBC **Prepared by :** Gavin Pfeifer **Approved by : _____** **Date :** February 26, 2007 **Date : _____** **Was a Change Notice Used as Basis for Change Order? (YES) (NO) IF yes X-Ref CN # ____**
Comments

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2. WORK TIMELINES 2
3. ENGINEERING, DESIGN, AND CONSTRUCTION STANDARDS 2

1. SCOPE OF WORK

This Schedule details the Work required to complete the engineering services for addition of an ADSS fibre optic communication cable on the existing 161kV transmission line 11L as per the SNC-Lavalin T&D amended proposal for engineering services 'ADSS Cable Installation on 11L, Oliver to Grand Forks, B.C.' dated February 9, 2007. The FortisBC 11L line is approximately 81 km and extends from the substation at Oliver to the substation at Grand Forks.

2. WORK TIMELINES

The Contractor shall complete the Work within the following timelines:

i. Engineering services as described in this scope of Work shall commence the week of February 12, 2007 and shall be completed on or before December 31st, 2007.

3. ENGINEERING, DESIGN, AND CONSTRUCTION STANDARDS

3.1. Standards

Unless otherwise described, all Work shall be done in accordance with current FortisBC standards and policies. The Contractor shall at all times keep himself and his personnel informed of the current FortisBC standards and polices including but not limited to the documents posted at:

https://portal.fortisbc.com/sites/fbccontractorinfo/default.aspx

User Name: bc\fbccontractor
Password: Contract1

3.2. Test Specifications

All testing shall comply with or exceed the IEEE (Institute of Electrical and Electronics Engineers) and/or ASTM (American Society for Testing and Materials Standards) and/or the Canadian Standards Association (CSA) policies and specifications and the best accepted industry standard practices.

For clarification on the application of standards the Contractor shall contact the FortisBC Project Engineer.

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1. GENERAL 1
2. CONTRACT PRICE 1
TABLE 1 CONTRACT PRICE 1

1. GENERAL

1.1 This Schedule "D" as part of the FortisBC LCD06040 Change Order #3 Project Package when taken into meaning with Schedule "D" of Agreement LCD06040 constitutes the payment details with respect to the Project.

2. CONTRACT PRICE

TABLE 1 CONTRACT PRICE

The Target Price breakdown for each portion of the Project, in Canadian Funds is:

	Fees:
Engineering Services – 4,250 hours estiamted Target Price:	$487,200.00
Engineering Management Plan Target Price:	49,577.00
Total Target Price:	**$ 536,777.00**

Environmental monitoring services shall be provided at the rates stated in Table II 'Labour Rates' of Schedule 'D' of Agreement LCD06040.

ASSIGNED PERSONNEL

Contractor Manager:

Name: Michel Kalazsnikow
Address: 1035 7th Avenue SW
Calgary, AB T2P 2M4

Phone: (403) 536-4860
Email: michel.kalazsnikow@snclavalin.com

FortisBC Engineer:

Name: Ian Finke
Address: 1290 Esplanade
Trail, BC V1R 4L4

Phone: (250) 368-0381
Cell: (250) 231-1667
Email: ian.finke@fortisbc.com

FortisBC Project Manager:

Name: Mike Leclair
Address: 1290 Esplanade
Trail, BC V1R 4L4

Phone: (250) 368-0373
Fax: (250) 368-0399
Cell: (250) 368-1434
Email: mike.leclair@fortisbc.com

1. ATTACHMENTS

This Schedule "F" as part of the FortisBC LCD06040 Change Order #3 Project Package when taken into meaning with Schedule "F" of Agreement LCD06040 details the attachments and reference documents required to complete the Work.

Project Package attachments:

i. Proposal Letter: Amended Proposal for Fortis ADSS Cable Installtion on 11L, Oliver to Grand Forks dated February 9, 2007

ii. SNC-Lavalin T&D Amended Proposal for Engineering Services dated February 9, 2007.

2. CONTRACT INTERPRETATION

Should any conflict or inconsistency exist among or between the Agreement documents, the Agreement documents shall be interpreted in the following order:

i. The executed General Conditions and the Schedules attached hereto shall govern over any Bid Documents or proposals;

ii. the General Conditions and Schedules shall govern over Contractor's clarification lists;

iii. for documents as revised by either party and approved by FortisBC, the latest revisions shall govern;

iv. figured dimensions on drawings shall govern, even though they may differ from scaled dimensions;

v. drawings of larger scale shall govern over those of smaller scale of the same date; and

vi. specifications issued by FortisBC shall govern over all drawings regardless of date.

SNC•LAVALIN
T&D

SNC•LAVALIN ATP INC.
(Part of SNC-Lavalin T&D)
P O Box 2176, Station "M"
1035 Seventh Avenue S W
Calgary, Alberta
Canada T2P 2M4

Telephone: (403) 539-4550
Fax: (403) 539-4551

February 9, 2007

Mike Leclair
Project Manager
FortisBC
Mike.Leclair@fortisbc.com

Dear Mike:

Re: Amended Proposal for Fortis ADSS Cable Installation on 11L, Oliver to Grand Forks

SNC-Lavalin ATP Inc. is pleased to provide this cost-plus proposal for the engineering services of the above-named project.

Item	Description	Proposal Price
1.	Engineering Services (4250 hours)	$ 487,200.00
2.	Environmental Management Plan	$ 49,577.00
3.	Environmental Monitoring	To Be Provided
	TOTAL	$ 536,777.00 (Plus GST/PST)

All charges, including hourly rates, direct charges, travel expenses, and third-party costs, will be calculated according to Schedule "D" of the Engineering Consulting Services Agreement LCD 06050 (dated December 1, 2006).

For important information about our exclusions, assumptions, and design parameters, please review the attached document, entitled "Proposal for Engineering Services."

We thank you for this opportunity, and look forward to the prospect of delivering this project and further enhancing the successful relationship between FortisBC and SNC-Lavalin

If you have any questions or concerns regarding this proposal, please call me to discuss.

Sincerely,

R.A (Dick) Molyneaux, P. Eng.
Vice President of Operations

SNC·LAVALIN T&D

Amended Proposal for Engineering Services

ADSS Cable Installation on 11L, Oliver to Grand Forks, B.C.

Background:
FortisBC requested an estimate for provision of engineering services for addition of an ADSS fibre optic communication cable on the existing 161kV transmission line 11L. The line is approximately 81 km and extends from the substation at Oliver to the substation at Grand Forks. It includes an in/out connection at the proposed Kettle Valley substation.

A preliminary proposal was delivered to FortisBC on November 30, 2006 and subsequently accepted. The preliminary stage resulted in the delivery of the following for FortisBC's review:

1. Project scope (included in this document)
2. ADSS Specification Document (submitted by M. Kalasznikow 01/19/2007)
3. Preliminary environmental plan (submitted by M. Kalasznikow 01/19/2007)
4. Engineering Services Project Manual (submitted by M. Kalasznikow 01/19/2007)
5. Engineering Services Schedule (submitted by M. Kalasznikow 01/19/2007)
6. EPC Schedule (submitted by M. Kalasznikow 01/19/2007)
7. Proposal for Engineering Services (submitted by J. Husch 01/23/2007)
8. Proposal for EPC Services (to be submitted at a later date)

Scope:
Engineering services will be provided to verify, modify, replace, or add the following, as required:

1. ADSS cable from the substation at Oliver to the substation at Grand Forks, with in/out connection at Kettle Valley substation.
2. Associated attachment and suspension hardware; splice enclosure; splices.
3. Overhead fibre from the adjacent transmission structures to the substation A-Frame, through owner-provided conduit to the control room.
4. Termination to the owner-provided fibre distribution panel.
5. Structures to accommodate the installation of the ADSS cable.

The scope of the engineering services will include the following activities and deliverables:

1. Review and extract all relevant and useable information from the project files provided by FortisBC.
2. Confirm ADSS cables selected by owner meet specifications.
3. Confirm design parameters, termination locations, and intermediate drop locations.
4. Confirm ADSS location on structures and line modifications/additions required.
5. Provide Line Design Specification documents for review, including all necessary drawings, specifications, investigations, reports, and documentation required to meet the Line Design Standards of the project.
6. Using the Owner's existing profile, digitize the existing FortisBC 11L ground profile for PLS-CADD use.
7. Complete PLS-CADD line layout of existing 11L with the ADSS fibre included from Oliver to Grand Forks.
8. Review design with owner at preliminary, detailed, and final stages of engineering.

9. Provide necessary bills of material.
10. Identify survey requirements.
11. Provide IFCR package.
12. Provide construction-ready IFC package stamped by APEGBC-registered engineer.
13. Provide Environmental Management Plan specific to the project. Advise Owner of any noncompliance with the EMP observed by the environmental monitor. Please note: additional costs associated to remedy violations of the EMP are not included, and are to be incurred by the Owner or their construction subcontractor.
14. Provide technical support during construction period.
15. Develop ADSS test plan and procedure to be completed by owner's subcontractor, and provide analysis and confirmation of test results.
16. Develop an end-to-end fibre path testing and reporting specification, to be completed by owner's subcontractor.
17. Once received from the contractor, SNC will prepare and issue all relevant As-Built drawings and documentation on both hard copy and electronic format. As-built transmission line plan and profile drawings will be in PLS-CADD format and will be stamped by an APEGBC-registered engineer.
18. Provide project management services as follows:
    a. Project planning and scheduling for engineering deliverables listed above, according to Engineering Services provided 01/19/2007.
    b. Monthly reporting on cost, progress, technical issues, and schedule issues.
    c. Communication and coordination with FortisBC.
    d. Preparation of a detailed change management process, including timelines, requirements, and approval processes for scope or variance changes.

Assumptions and Exclusions:

This proposal makes the following assumptions:

1. Owner's technical information is available, timely and accurate.
2. Owner will accept drawings based on pre-existing profile information. Contractor will spot-check validity of pre-existing profile information during preparation of as-built drawings.
3. Project decision making from owner is forthcoming in a timely fashion.
4. Design reviews performed according to schedule.
5. Telecommunication and protection for 11L are to be provided by the substation project at Kettle Valley.
6. No changes to protection are required.
7. No substation work is required.
8. System integration will be done by owner.
9. Specification for reel testing of fibre is included, but testing will be completed by Shaw.

The scope does not include:

1. Any reconfiguration of existing protection schemes, SCADA functionality, communication applications, or networking within the substation.
2. Fibre distribution panels, communication multiplex electronics, or fibre drivers in the control buildings.

3. Redundancy arrangements between fibre and existing PLC.
4. Connection to the existing equipment associated with 11 Line and area communication, including:
    a. Protection
    b. SCADA
    c. Voice and mobile communication
5. Cutover or outage planning.

SURVEYING SERVICES AGREEMENT

LAT07015

Between

McElhanney Associates Land Surveying Ltd.
102-130 Nanaimo Avenue W.
Penticton, BC V2A 8G1

And

FortisBC Inc.
1290 Esplanade, Box 130
Trail, BC V1R 4L4

SURVEYING SERVICES AGREEMENT

THIS AGREEMENT dated as of the 25th day of July, 2007

BETWEEN:

FORTISBC INC., a corporation established by a special Act of the Legislature of the Province of British Columbia, having its head office in the City of Kelowna, with an office in the City of Trail, in the Province of British Columbia.
("FortisBC")

- AND -

MCELHANNEY ASSOCIATES LAND SURVEYING LTD., a corporation incorporated under the laws of British Columbia, having an office in the City of Penticton, in the Province of British Columbia..
(the "Service Company")

THIS AGREEMENT WITNESSES that in consideration of the covenants and agreements herein contained the parties hereto agree as follows:

1. SERVICES RETAINER

1.1 FortisBC agrees to retain the Service Company to provide FortisBC with the consulting services described in Schedule "A" hereto and such other consulting services as FortisBC and the Service Company may from time to time agree upon (the "Services") and the Service Company agrees to provide the Services to FortisBC.

1.2 The Service Company shall be responsible for providing FortisBC with temporary personnel who are qualified to perform the Services (the "Qualified Personnel"). The Service Company shall also name a Contact Person in Schedule "A" through whom all communications shall be conducted with FortisBC pursuant to this Agreement.

1.3 Where the Service Company is providing FortisBC with two or more types of Services, the Services shall be grouped into categories as described further in Schedule "A" ("Service Categories") and shall be grouped according to the requirements of FortisBC and the respective qualifications of the Qualified Personnel.

1.4 FortisBC shall have sole discretion to call upon the Service Company from time to time to request that the Service Company send Qualified Personnel from the applicable Service Categories to perform the Services for FortisBC. FortisBC reserves the right to determine how many of the Qualified Personnel shall be required in any particular month, the length of time the Services will be required and the Service Categories from which the Qualified Personnel shall be selected. The Service Company on acceptance of the Request for Services shall ensure there are a sufficient number of Qualified Personnel available at all times to satisfy the Service request. The parties further agree that FortisBC is under no obligation to make a minimum number of requests for Services or retain a minimum number of Qualified Personnel in any particular month.

2. PAYMENT TERMS

2.1 In consideration for the Services rendered by the Service Company under this Agreement, FortisBC shall pay to the Service Company the consulting fees specified in Schedule "A" (the "Fees") within thirty (30) days of receipt of the Service Company's invoice. The Service Company shall invoice FortisBC monthly for the Services in accordance with the invoice procedure set out in Schedule "A".

2.2 The Service Company shall attach an executed copy of the "Standard Request Form For Services" to each invoice submitted under this Agreement. All invoices shall be submitted to the FortisBC representative requesting the Services.

2.3 Unless otherwise agreed in writing, the Service Company shall submit invoices by the 15th of each month for Services rendered to the end of the previous month.

2.4 FortisBC shall reimburse the Service Company for all reasonable expenses actually and properly incurred by the Service Company or the Qualified Personnel in the performance of the Services. FortisBC shall pay these expenses in accordance with the normal practices of FortisBC, which are established from time to time.

2.5 If the Service Company is a GST registrant and has provided a GST registration number in Schedule "A", FortisBC will pay GST in addition to the specified fees. GST must be shown separately on all invoices.

3. TERM AND TERMINATION

3.1 This Agreement shall remain in full force and effect for the term specified in Schedule "A" subject to earlier termination as provided in this Agreement.

3.2 The term may be renewed or extended by the mutual written agreement of

FortisBC and the Service Company.

3.3 Either party may terminate this Agreement by giving the other party thirty (30) days written notice. If the Agreement is terminated, FortisBC is liable only for the payment for Services rendered to the date of cancellation. The obligations of the Service Company under this Agreement shall terminate upon the earlier of the Service Company ceasing to be retained by FortisBC or the termination of this Agreement by either party.

3.4 Either party may terminate this Agreement at any time in the event of the failure of the other party to comply with any of the provisions of this Agreement by giving the other party five (5) days written notice. If the party receiving such notice fails to remedy such failure within five (5) days of receiving the notice, the Agreement shall terminate on the date set forth in the notice.

3.5 Notwithstanding any termination of this Agreement, the provisions of Sections 4.3, 7.1, 8.1 and 8.2 and any other provisions of this Agreement necessary to give effect to these provisions, shall continue in full force and effect following termination.

4. INDEPENDENT CONTRACTOR

4.1 The relationship of the Service Company to FortisBC will be that of an independent contractor and not an employee, partner or agent.

4.2 The Service Company may from time to time during the term of this Agreement provide consulting services to other persons, firms and corporations, provided that the Service Company shall at no time while this Agreement remains in force provide ongoing managerial services (immediately responsible for the management and direction of the competitor) to any competitor of FortisBC that is not an affiliate of FortisBC. For the purposes of this Agreement, “affiliate” shall have the meaning it is given in the Canada Business Corporations Act.

4.3 The Service Company confirms and agrees that there are no employee related benefits or fringe benefits of any kind receivable in connection with the performance of the Services. The Service Company is solely responsible for making contributions for Employment Insurance, Workers’ Compensation, Canada Pension Plan, employee income tax deductions (submitted directly to the government), insurance costs or other similar levies. The Service Company shall indemnify and save harmless FortisBC, its affiliates, officers and directors from and against all payments, costs, damages, expenses, interest, penalties and other liabilities assessed against, paid or incurred by FortisBC or its affiliates in connection with such contributions or payments. The Service Company is not

entitled to vacation pay, bonuses or other employment benefits as part of the Services performed.

4.4 The Service Company covenants and agrees that it shall not delegate performance of the Services to any person, partnership or corporation, other than the named Qualified Personnel, without the prior written consent of FortisBC, which consent may be arbitrarily withheld.

4.5 The Service Company shall not enter into any contract or commitment in the name of or on behalf of FortisBC or bind FortisBC in any respect whatsoever.

4.6 Upon request by FortisBC, the Service Company shall provide FortisBC with a copy of its business plan, client list, advertising materials and other evidence of its status as an independent contractor. This section shall survive the expiry or termination of this Agreement.

5. INSURANCE

5.1 The Service Company shall procure and maintain at its own expense, with respect to and for the duration of the Agreement the policies for insurance coverage described in Schedule "B" hereto and such other insurance as may be required from time to time in the course of providing the Services.

5.2 All such policies of insurance shall provide thirty (30) days written notice of material change or cancellation, a waiver of subrogation against FortisBC and all persons with whom FortisBC may be participating, and be placed with insurers and in a form acceptable to FortisBC.

5.3 Service Company shall provide FortisBC with evidence of compliance of Workers' Compensation coverage where applicable and shall provide FortisBC with a certified Certificate of Insurance within ten (10) days of signing the Agreement.

6. LICENSES, PROFESSIONAL MEMBERSHIPS AND PERMITS

6.1 The Service Company shall be responsible for obtaining all necessary licenses, registrations and permits and for complying with all applicable federal, provincial and municipal laws, codes and regulations in connection with the provision of the Services hereunder. Where applicable, the Service Company is responsible for ensuring that each of the Qualified Personnel is a member in good standing with the professional association, or associations with which he is affiliated and in which membership is necessary for the Qualified Personnel or the Service

Company to carry out the Services. The Service Company shall, when requested, provide FortisBC with adequate evidence of compliance with this Section.

7. INDEMNITY

7.1 The Service Company shall indemnify and save FortisBC harmless from and against all claims, actions, losses, expenses, costs or damages of every nature and kind whatsoever which FortisBC, its affiliates, or their officers, employees or agents may suffer as a result of the negligence of the Service Company or the Qualified Personnel in the performance or non-performance of this Agreement.

8. WARRANTIES

8.1. The Service Company represents and warrants that it has the experience and capability to and will efficiently and expeditiously accomplish all Services in a good and proper manner and otherwise in accordance with this Agreement. The Service Company shall also ensure that all of the Qualified Personnel, its agents, subcontractors and assigns are suitably qualified to perform the Services in accordance with this Agreement.

8.2. The Services shall be subject to inspection by FortisBC. FortisBC's inspection approval, or final acceptance of the Services shall not relieve the Service Company from any of its obligations under this Agreement.

9. CONFIDENTIALITY AND INTELLECTUAL PROPERTY

9.1 All information and data provided to the Service Company and the Qualified Personnel by FortisBC or created by the Service Company or the Qualified Personnel for FortisBC under this Agreement will become and remain the property of FortisBC. The Service Company and the Qualified Personnel will keep all such information and data strictly confidential, and if requested by FortisBC will execute and deliver a confidentiality agreement in the form required by FortisBC.

9.2 "Confidential Information" means any information previously or subsequently disclosed directly or indirectly to the Service Company by FortisBC orally, in writing, in drawings, by site visits, by electronic means or in any other way, and without limiting the generality of the foregoing, includes certain trade secrets, and proprietary and confidential information acquired through the expenditure of time, effort and money, of a technical and business nature and information relating to the assigned projects, assets, liabilities, finances, commercial arrangements, customer information, data, programs, codes, methods, process, techniques, formulas, designs, prototypes, compilations of information,

Intellectual Property, business opportunities, research and development, management, labor relations, operations, equipment and facilities of FortisBC and its affiliates.

9.3 The Service Company shall use all reasonable efforts to protect FortisBC's interest in the Confidential Information and keep it confidential, using a standard of care no less than the degree of care that the Service Company would be reasonably expected to employ for its own similar confidential information. In particular the Service Company shall not directly or indirectly disclose, allow access to, transmit or transfer the Confidential Information to a third party without the FortisBC's prior written consent. The Service Company shall disclose the Confidential Information only to those of its employees, or to those employees of any consultant of the Service Company, who have a need to know the Confidential Information for the purpose to doing the work. The Service Company shall, prior to disclosing the Confidential Information to such employees and consultants, issue appropriate instructions to them to satisfy its obligations herein and obtain their agreement to receive and use the Confidential Information on a confidential basis on the same conditions as contained in this Agreement.

9.4 The Confidential Information shall not be copied, reproduced in any form or stored in a retrieval system or data base by The Service Company without the prior written consent of FortisBC, except for such copies and storage as may reasonably be required internally by The Service Company for the Purpose.

9.5 Unless otherwise provided in this Agreement, ownership of all recorded information, including all designs, technical reports, photographs, drawings, plans, specifications, and computer software, whether susceptible to copyright or not (the “Documentation”) and all unrecorded information, including all methods, processes, know-how, ideas, designs, inventions, discoveries, and improvements, whether patentable or not (the “Information”) produced, written, prepared, conceived, developed, or first reduced to practice (“Produced”) by the Service Company or the Qualified Personnel in the performance of the Services shall, as of the time produced, vest in and remain with FortisBC. The Service Company, and if necessary the Qualified Personnel, shall execute such conveyances and other documents relating to copyright in or title to the Documentation and Information that FortisBC may require. The Service Company or any of its Qualified Personnel shall not use or divulge the Documentation and Information other than in the performance of the Services.

9.6 Upon the expiry or termination of the Agreement, the Service Company shall return to FortisBC any property, documentation or confidential information which is the property of FortisBC, including equipment, keys and access cards.

10. FORCE MAJEURE

10.1. If performance of any obligation under or arising out of this Agreement, except an obligation to pay money, is delayed or prevented by an Event of Force Majeure, the time for performance will be extended by the period of the delay, but no longer than the continuance thereof and neither party will be liable in damages or otherwise to the other party nor will any action, claim or demand be taken or made against that party by reason solely of such delay or default in the performance of such obligation.

10.2. The party responsible for the performance of any such obligation will use all reasonable diligence to remove the Event of Force Majeure as soon as is reasonably practicable after notice of the same will have come to its attention except that the settlement of any strike, lockout or other industrial dispute will be entirely within the discretion of any party directly concerned therewith and nothing herein will require the settlement thereof by acceding to the demands of the other party to the dispute where such course is considered inadvisable in the absolute discretion of the party so concerned.

10.3. Each party will keep the other promptly informed of any delay or prevention of the performance of any obligation on its part under this Agreement where such delay or prevention is caused by an Event of Force Majeure, and of the likely duration of such delay or prevention, and of the cessation of such circumstances.

10.4. For purposes of this Article 9, "Event of Force Majeure" means an act of God, earthquake, flood, storm, tempest, washaway, explosion, fire, act of war, act of public enemies, riot, civil commotion, strike, lockout, ban, "go-slow" or "work to rule" activity, work stoppage, restraint of labour or other similar acts (whether partial or entire), shortage of labour or essential materials, reasonable inability to obtain contractors, delays of contractors, inability or delay in obtaining any required licence, approval or permit or any other event or circumstance (whether or not of a kind specifically enumerated above) which is not within the reasonable control of a party.

11. GENERAL TERMS

11.1 The division of this Agreement into Articles and Sections and the insertion of headings are for the convenience of reference only and shall not affect the construction or interpretation of this Agreement.

11.2 In this Agreement words importing the singular number only shall include the plural and vice versa and words importing the masculine gender shall include the feminine and neuter genders and vice versa and words importing persons shall include individuals, partnerships, associations, trusts, unincorporated organizations and corporations and vice versa.

11.3 This Agreement shall ensure to the benefit of and be binding upon the heirs, executors, administrators and legal personal representatives of the Service Company and the successors and assigns of FortisBC respectively.

11.4 This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof and cancels and supersedes any prior understandings and agreements between the parties with respect thereto. There are no representations, warranties, forms, conditions, undertakings or collateral agreements; express, implied or statutory between the parties other than as expressly set forth in this Agreement.

11.5 No amendment to this Agreement shall be valid or binding unless set forth in writing and duly executed by both of the parties. No waiver of any breach of any term or provision of this Agreement shall be effective or binding unless made in writing and signed by the party purporting to give the same and, unless otherwise provided in the written waiver, shall be limited to the specific breach waived.

11.6 Except as may be expressly provided in this Agreement, neither party may assign his or its rights or obligations under this Agreement without the prior written consent of the other party.

11.7 If any provision of this Agreement is determined to be invalid or unenforceable in whole or in part, such invalidity or unenforceability shall attach only to such provision or part thereof and the remaining part of such provision and all other provisions hereof shall continue in full force and effect.

11.8 Any demand, notice or other communication to be made or given in connection with the Agreement shall be made or given in writing and may be made or given by personal delivery or by registered mail to the addresses specified in Schedule "A".

11.9 The Service Company acknowledges receipt of a copy of this Agreement duly signed by FortisBC.

11.10 This Agreement shall be governed by and construed in accordance with the laws of the Province of British Columbia and the applicable laws of Canada. For the purpose of all legal proceedings this Agreement shall be deemed to have been performed in the Province of British Columbia. FortisBC and the Service

Company each attorns to the jurisdiction of the courts of the Province of British Columbia.

IN WITNESS WHEREOF the parties have executed this Agreement as of the date first above written by their duly authorized representatives in that behalf.

MCELHANNEY ASSOCIATES LAND SURVEYING LTD.

Per: _____

Print Name: _____

Title: _____

Date: _____

FORTISBC INC.

Per: _____

Print Name: _____

Title: _____

Date: _____

SCHEDULE "A"

SURVEYING SERVICES AGREEMENT
Between FortisBC Inc.
and
McElhanney Associates Land Surveying Ltd.
Dated July 25, 2007

Service Company's Name:	McElhanney Associates Land Surveying Ltd.
Address:	102-130 Nanaimo Avenue W Penticton, BC V2A 8G1
Contact Person	Derek Blaszak, Branch Manager, BCLS, CLS
Telephone: Fax: Cell: Email:	(250) 492-7399 (250) 492-5488 (250) 488-0478 dblaszak@mcelhanney.com
Term:	July 25, 2007 – July 25, 2008 If the Work is unable to commence as a result of any necessary regulatory approval from the British Columbia Utilities Commission as determined by FortisBC, FortisBC may terminate the Contract without having to pay any damages to the Contractor.
Services:	Surveying, tech work, utility locating, aerial mapping, CAD work; where and when as requested by FortisBC Inc. Legal surveys by nature are a continuously evolving and changing project. As FortisBC can see from the foregoing this is usually due to the fact that large portions of the work, the amount of work and the major efficiencies of the project are not completely defined (or definable at all) until the project is well underway and the intricacies and constraints of each location are fully known. It is at this time that all parties are able to make the appropriate decisions using the appropriate information. Similarly the scope and cost of the

engineering portion of the project will undoubtedly change significantly once the Service Company sees how much of the corridor the Service Company will be able to map using aerial photography. For this estimate the Service Company believe the Service Company have assumed a worst case scenario which will be modified to the benefit of FortisBC depending on input from engineering and the amount of photogrammetric mapping completed.

There also are other factors outside of our control that can possibly arise which affect our productivity and thus the cost of the project. Factors such as GPS satellite availability, forest fire restrictions or hazards, bedrock proximity to the surface (affects posting of the legal corners), decommissioning of roads or poor access into the site, and of course change in scope or rework.

Fee Schedule
Effective through March 31, 2008

PERSONNEL HOURLY RATE

2-Man Survey Crew	$160.00 *
(inclusive of standard survey equipment and fully equipped vehicle)	
Field Surveyor (includes vehicle)	$ 90.00 *
Senior Field Surveyor (includes vehicle)	$105.00 *
Field Assistant	$ 55.00
Senior Office Technologist	$ 95.00
Office Technologist	$ 75.00
Project Manager/Senior BCLS & CLS	$140.00
BCLS	$120.00
Application Processing	$ 75.00
Project Assistant	$ 65.00

* plus $0.65/km for mileage exceeding 150 km/day

Note: In general, there is no surcharge for regular overtime work, unless specifically requested by the client, then a multiple of 1.25 the regular rate applies

REIMBURSABLE COSTS

Reproductions; deliveries; travel; meals and lodging; motels; renderings and photos; mylars; diskettes; agency fees; equipment and materials, not specifically included in the scope of work.
• All reimbursable costs shall be billed at cost plus 15%.

• Mileage shall be billed at $0.65/km (office staff only).
• All accounts are due net 30 days from the date of invoice.
• Outstanding accounts shall be charged 1.5% compounded monthly (19.6% per annum).

****Description for Fixed Fee Unit Price:**

ACLS Monuments	$4.60 /ea
ACLS Plan Fee	$57.50 /ea
BCACS - Rinex (data download)	$6.75 /hr
BC OnLine Title Searching Fees	$15.00 /title
BCLS CheckList	$30.00 /checklist
CDGPS Receiver	$100.00 /day
Courier-envelope pkg	$11.00 /ea
Courier-plan in tube	$15.00 /ea
Gator (digital image download)	$9.78 /image
Gator (image search)	$5.00 /search
GPS Receiver Handheld	$25.00 /day
GPS Receiver (1 unit)	$3,750.00 /month
GPS Receiver (2 units)	$500.00 /day
GPS Receiver (2 units)	$62.50 /hr
Guard Stake	$3.75 /ea
Iron Post	$7.25 /ea
Lath 48"	$0.75 /ea
Legal Iron Post & Guard/Stake	$11.00 /set
Legal Metal Marker-Cap & Reference Post	$37.00 /set
Legal Plan and Documents - BC OnLine (image download)	$17.00 /image
Mascot-Geodetic Control Marker-Long Listing	$2.46 /list
Mascot-Geodetic Control Marker-Short Listing	$1.23 /list
Per Diem $46.00/day/Personnel (B @ $11.50, L @ $13.80, D @ $20.70)	$46.00 /day
Quad ATV or Snowmobile	$95.00 /day
Reference Pipe Post (2 piece set)	$20.60 /set
Robotic Total Station (200.00/day, $25.00/hr)	$200.00 /day
Target Material	$9.00 /target
Mileage Charge - office staff travel to job site	$0.65 /km
Plus $0.65/km for mileage exceeding 150 km/day	$0.65 /km
Fully equipped 4x4 truck (when not included in hourly rate)	$15.00 /hr
Blueprints, mylar 11 x 17, size B	$3.00 /print
Blueprints, paper 11 x 17, size B	$0.50 /print
Blueprints, mylar 17 x 22, size C	$6.00 /print
Blueprints, paper 17 x 22, size C	$0.75 /print
Blueprints, mylar 22 x 34, size D	$11.75 /print
Blueprints, mylar 24 x 36	$13.50 /print
Blueprints, paper 22 x 34, size D	$1.50 /print
Blueprints, paper 24 x 36, size D	$2.00 /print

Blueprint - Oversize:	
Mylar @ $3.75/10 inches	$3.50 /10 inches
Paper print @ $0.50/10 inches	$0.50 /10 inches
Plot Print:	
Paper-regular print @ $1.00/10" (24 x 24)	$2.40 /print
Paper-regular print @ $1.00/10" (24 x 36)	$3.60 /print
Paper-regular print @ $1.50/10" (36 x 36)	$5.40 /print
Paper-mosaic print @ $1.20/ea (Letter size)	$1.20 /print
Paper-mosaic print @ $2.00/10" (ledger size)	$3.60 /print
Paper-mosaic print @ $2.00/10" (24 x 24)	$4.80 /print
Paper-mosaic print @ $2.00/10" (24 x 36)	$7.20 /print
Paper-mosiac print @ $2.5/10" (36 x 36)	$9.00 /print

GST Registration No.: 84588 4741

FortisBC Representative: Mike LeClair

Address: 1290 Esplanade, Box 130
Trail, BC V1R 4L4
Telephone: (250) 368-0373
Fax: (250) 364-1270
Cell: (250) 368-1434

SCHEDULE "B"

Surveying Services Agreement
between FortisBC Inc.
and McElhanney Associates Land Surveying Ltd.
Dated July 25, 2007

Insurance Requirements: The Service Company shall, without limiting any of the obligations and liabilities under this Agreement, procure and maintain at its own expense, with respect to and for the duration of this Agreement, appropriate insurance covering its obligations under this Agreement, including the following minimum insurance coverage:

a) Workers' Compensation, to the full extent required in the jurisdiction in which the services are being performed and wherever the contracts of employment for the Service Company's personnel are made or expressed to be made.

b) Employer's Liability Insurance covering each employee engaged by Consultant in respect of the Work in an amount of Two Million ($2,000,000) Dollars, where such employees are not covered by Workers' Compensation;

c) Automobile Liability Insurance covering all motor vehicles owned, operated and/or licensed by the Service Company with a minimum bodily injury and property damage limit of Two Million ($2,000,000) Dollars inclusive; and

d) Comprehensive General Liability Insurance with a bodily injury, death and property damage limit of Two Million ($2,000,000) Dollars inclusive; and, without restricting the generality of the foregoing provisions, such coverage shall include extensions known as Cross Liability: Blanket Contractual; Products and Completed Operations; Personal Injury; Occurrence Property Damage; Non-Owned Automobile Liability; Company Owners and Contractors Protective; Contingent Employers Liability.

e) Professional Liability Errors and Omissions Insurance covering all claims arising out of errors and/or omissions of Consultant for a limit of not less than Two Million ($2,000,000) Dollars; and

f) All Risk Property Insurance covering all risks of physical loss or damage to property of every description in any way involved in Work and *owned by Consultant or for which Consultant is legally liable or responsible*, for an amount not less than the replacement value of such property.

SCHEDULE "C"

Surveying Services Agreement
Between
FortisBC Inc. and McElhanney Associates Land Surveying Ltd.
Dated July 25, 2007

STANDARD REQUEST FORM

(See Attached)

STANDARD REQUEST FORM FOR SERVICES

Submitted by: _____ **Contract # LAT07015**

SDP # _____ **SAP Work Order: To Be Assigned on a Per Project Basis**

FortisBC Inc.
1290 Esplanade, Box 130
Trail, BC V1R 4L4

Date of Request: _____

Name of Service Company: **McElhanney Associates Land Surveying Ltd.**
Address: 102-130 Nanaimo Avenue W
Penticton, BC V2A 8G1

Number of Qualified Personnel Required: _____

Names of Qualified Personnel	Service Category	Length of time the Services will be required	Estimated Cost

Scope of Services Required: _____

MCELHANNEY ASSOCIATES LAND SURVEYING LTD.

Per: _____

Print Name: _____

Title: _____

FORTISBC INC.

Per: _____

Print Name: _____

Title: _____

Contractor to submit and attach a copy of this form duly executed with each invoice.

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PAUWELS CANADA INC.

MEMO

To: **Gavin Pfeifer, Fortis BC**

From: **Brett Todd, Pauwels Canada**

Date: **August 14, 2006**

Re: Proposal for Fortis BC – Kettle Valley Transformers

Further to our recent discussions, Pauwels is pleased to provide Fortis BC with this revised proposal for the two Kettle Valley transformers for shipment from our factory in July 2007. In order to guarantee these July 2007 shipments, we will require from you a formal notice to proceed (either a purchase order or a letter of intent) on or before August 31, 2006.

For the Kettle Valley transformers that we quoted to you back in December 2005, we offer for your consideration, the following options to address the pricing:

- Option 1 – A revised firm price of $1,565,000 per transformer. Note that this price includes freight, offloading to site, field assembly, oil filling, testing and supervision by our field service personnel.

- Option 2 – A price that is subject to an adjustment relative to the prices of the key transformer materials at the time we have to order these materials. This base price is $1,320,000 and is subject to adjustment as described in the following pages of this document. This base price also includes all the items listed in Option 1 above. When we obtain firm pricing commitments from all our suppliers we will meet with Fortis BC and adjust our base price accordingly. We expect to have these commitments no later than December 31, 2006.

Note that in both pricing options above, we have assumed that Fortis BC prefers not to use the expensive MR-Vacutap tap changer that was included in our original quotation. This change away from the MR Vacutap was done on the Arawana and Princeton units that we are currently manufacturing as well as the recent order for Nk'Mip. Note that on these 3 units we are providing ABB UZFRT tap changers instead of the MR Vacutap tap changer. However, on the Kettle Valley units we must use the MR-M1 type because the ABB type is not suitable for these transformers.

We are prepared to meet with you at any time to discuss this proposal with you in greater detail. We are also prepared to discuss with you any alternative price adjustment arrangements to ours that you may have. Please understand that the contents of this document are confidential and shall not be used by others outside of Fortis BC.

Yours truly,

Brett Todd, P. Eng.
Sales Manager
Pauwels Canada Inc.

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PAUWELS CANADA INC.

MEMO

Details of Pricing Option 2 for Kettle Valley Transformers

Pauwels Canada strives to offer value for our customers in our products, services, prices and commercial terms. We continually do our utmost to drive cost out of our supply chain through sourcing with our entire organization. In the past, we have been generally able to provide our customers with stable prices. However, in recent times, material price volatilities in the world economy along with the unwillingness of many of our suppliers to guarantee to us firm prices for materials beyond few months into the future, have forced us to mitigate some business burdens associated with long term pricing by implementing price review processes similar to what we are proposing herein for Fortis BC.

We propose to adjust our quoted price for the transformer based upon the best available material price data at the time of submitting our quotation. Our price adjustment proposal is based upon the actual manufacturing cost breakdown of the transformer and the base price for the transformer (our quoted price) was determined by our knowledge of material prices at time of our quotation.

The new prices for the Kettle Valley transformers will be determined by the percentage content of the value that each key transformer material component represents in the pricing structure of the product. The pricing structure is very specific for the Kettle Valley transformers and is a reflection of your specification. These key material components are copper, silicone (core) steel and oil. We propose to escalate/de-escalate these key materials at the time of order and when we have the firm pricing from our suppliers. Note that our proposal means that a significant portion of our price is not subject to adjustment. This portion of the prices includes all other miscellaneous transformer materials, direct labour, all overheads and profits.

Below is a summary of the cost content for the Kettle Valley transformers:

Key transformer component	**Percentage of Cost of Product**
Copper	10%
Silicone (Core) Steel	11%
Transformer Oil	4%
Other transformer materials, direct labour, overheads, margins, freight, etc.	75%
Total	100%

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MEMO

Reference data used to escalate/de-escalate the quoted price:

We appreciate that our customers must feel comfortable with the criteria for our escalation/de-escalation proposal. These criteria should be relevant and verifiable to a reasonable extent and should be the same indices that we are using to determine to cost of the product. We propose the following reference data be used use in the calculation of the price escalation/de-escalation:

1. NYMEX for Copper: The source data can be found at http://www.nymex.com/cop_fut_csf.aspx. At the time we quoted this transformer we used $1.80 per pound of copper.

2. Core steel – Due to the uniqueness of core steel and the uncertainty in the market, we are unable to provide market price indicators. Therefore, we propose to use our actual quoted core steel costs to determine the price adjustment. We used $1.60 per pound in our quotation and propose to use this as the base price for the core steel. We will adjust the price of the core steel using $1.60 as the base.

3. Oil – Again, there no market price indicators for transformer oil and we propose to use our actual quoted oil costs to determine the price adjustment. We used $1.41 per litre in our quotation and propose to use this as the base price for the oil. We will adjust the price of the oil using $1.41 as the base.

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MEMO

Proposed Price Adjustment Formula

Our quoted price is based on our quoted costs of major raw materials on the date of our quotation (i.e. December 2005). The quoted price is directly related to the prices of raw materials for this type of transformer. Should there be any variation in these prices and index numbers, the revised price payable shall be subject to adjustment, up or down, in accordance with the following formula:

Pn = Pq * ((0.10*Ln/Lq) + (0.11*Cn/Cq) + (0.04*Tn/Tq) + 0.75)

Below is a description of the items in the above formula:

Pn	=	New Price adjusted with the above formula
Pq	=	Base Price ($1,320,000)
Lq	=	NYMEX prices for Copper used at the time of our quotation ($1.80/lb).
Ln	=	New NYMEX prices for Copper at the time of ordering winding conductor.
Cq	=	Base price for the core steel at time of quotation ($1.60/lb).
Cn	=	New Price for the core steel at the time of ordering core.
Tq	=	Price for oil at time of quotation. ($1.41 per litre).
Tn	=	New Price for oil three (3) months prior to the delivery of the transformer

Substituting the above values in the formula, we obtain the following price adjustment formulae:

Pn = $1,320,000 * ((0.10*Ln/1.80) + (0.11*Cn/1.60) + (0.04*Tn/1.41) + 0.75)

GE Energy

Network Reliability
Products and Services

T 780 432 8079
F 780 432 8093
E erin.mckinley@ge.com

9353 – 45th Avenue
Edmonton, AB T6E 5Z7 Canada

August 18, 2006

FortisBC Inc.
1628 Dickson Avenue
Kelowna, BC V1Y 9X1

ATTENTION: **Mr. Gavin Pfeifer**
Coordinator, Purchasing and Contracts

REFERENCE: **Invitation to Bid LPT05067**
Supply of Transformers - Kettle Valley
GE Proposal No. 7-9262-21263 Rev. 08/18

Dear Mr. Pfeifer:

We are pleased to offer our GE Prolec Transformers for your consideration as follows.

I. PRICES:

Item 1: Kettle Valley Substation - Qty. 2, three phase, oil immersed, transformer, 24/32/40 MVA, ONAN/ONAF/ONAF, 60 Hz, 65°C temperature rise, high voltage of 161 X 138 kV Delta connection with De Energized Tap Changer, low voltage of 25 kV Wye connection with Load Tap Changer.
Price: $1,574,400.00 Each

Loss Evaluation: If the sum of the tested core loss times $6,000.00/KW and the tested load loss @ 24 MVA times $3,000.00/KW exceeds $414,000.00; the excess dollars will be credited to the owner.

Item 2: Qty. 2, Unit price adder for off-loading and place on pad, considering free and clear access to the substation pad.
Price: $33,800.00 Each

Item 3: Qty. 2, Unit price adder for field assembly, drying process, vacuum oil filling, and field tests, either for Item 2A, (See additional information below.) Note, if this item is purchased, GE Prolec will extend the warranty period for two additional years.
Price: $30,680.00 Per Unit

Item 4: Price deduct to have a LV LTC Vacuum Switch type, RMV A 1320
Deduct: $7,200.00 Per Unit

Item 5: Monitors, Communication Controllers, Accessories - The seller is offering the following monitoring equipment as optional extras:

- HYDRAN M2 – monitors dissolved gas and moisture;
- HYDRAN 201Ti – monitors the dissolved gas;
- AQUAOIL 400 - monitors the moisture.

Please refer to the enclosed documents for discounted pricing, and to our "Why We Monitor Transformers" explanation.

Buying your Hydran at the same time as your transformer will provide various benefits and savings as follows:

- Price of the actual Hydran is approximately 15% less than buying the Hydran after market. Costs of the Hydran can be capitalized along with your transformer asset.
- Hydran can be installed and tested in the factory and shipped with the transformer. Save time versus Field Installation at a later time.
- Field Commissioning of the Hydran can take place at the same time as the transformer commissioning.

Item 6: Spare Parts - Seller does not recommend spare parts for stock. After engineering is completed, a renewable parts list can be made available for the specific transformer and will be included in the final drawings. Current pricing of the renewal parts is furnished separately.

Cost of spare parts is not included in the unit price of the transformer. (*Prices apply if ordered at the same time as the transformer.)

PRICE ADDERS*

Qty.	Description	Item 2A
1	HV Bushing	$14,400.00
1	LV and Neutral Bushing	$2,160.00
1	Set of Gaskets	$1,200.00
1	Fan	$1,224.00

II. EXCEPTIONS / COMMENTS / CLARIFICATIONS:

Seller makes clarification; GE-Prolec is quoting according to the Technical and Commercial Terms and Conditions stated this proposal letter. GE-Prolec will gladly negotiate Terms and Conditions at a later date if we are competitive with this bid.

Design, Manufacture and Test according to CSA Standards.

Take the following exceptions / clarifications to SPECIFICATION:

SDP # TG2500 (Item 2, Kettle Valley Substation)

1.10.2... Seller makes clarification to this section; please refer to section VI for approval drawings delivery cycle.

1.11.8... Seller makes clarification to this section; a three-way impact recorder will be provided for shipment. Impact recorder must be returned to GE-Prolec (using our UPS account for shipping expenses) within 60 days of delivery. A penalty charge of $2,500.00 will apply if not returned in that period of time.

1.11.9 / 3.11... Seller makes clarification to this section; if customer desires to do the SFRA prior to shipment, please consider a $2,500.00 price adder, the analysis will be done with the Double M5100 equipment.

1.11.10 / 3.11... Seller makes clarification to this section; if customer desires the SFRA at arrival to site, please consider a $12,500.00 price adder, the analysis will be done with the Double M5100 equipment.

1.12... Seller makes clarification to this section; if buyer purchases Item 2B, GE-Prolec will be responsible for the placing on pad of the transformers.

1.13... Seller makes clarification to this section; if buyer purchase Item 7 per transformer, GE-Prolec will be responsible for the assembly on site for the transformers.

1.14... Seller makes clarification to this section; please refer to section VI for the offered shipping cycles of the transformers.

1.17... Seller makes clarification to this section; it is acceptable for the customer agent to visit factory to inspect transformers or witness tests, provided the factory schedules and personnel are not affected nor delayed. The customer agent is responsible for furnishing his own transportation, lodging and food expense. Transformers will be tested in accordance with the latest revision of the "Standard Test Code for Transformers" ANSI/IEEE C57.12.90. The units will be shipped upon completion of the tests. Formal test reports if required will be mailed promptly thereafter. We do not hold units pending approval of test reports. Test Reports may be submitted for review,

not approval, only when the Buyer's representative is present at factory during testing or if the results exceed guarantees for losses and impedance.

2.1.2... Seller makes clarification to this section; the pre-fault voltage shall be 110% of rated tap voltage.

2.4.2... Seller makes clarification to this section; GE-Prolec allows 2 short after the winding is complete.

2.5... Seller makes clarification to this section; GE-Prolec will provide Voltesso 35 oil or similar.

2.7... Seller makes clarification to this section; GE-Prolec will provide ANSI standard bushings.

Seller makes clarification to this specification; GE-Prolec will provide a LV LTC for HV variations of +11.111% / -9.09% and LTC shall be RMVII – Vacuum type with reactor on LV side.

III. ENCLOSURES:

1. Outline Drawing.
2. Technical Data Sheets.
3. Technical Questionnaires.
4. Painting System.

IV. INSTALLATION SERVICES:

This quotation does not include rigging contractor costs, unloading costs, costs incurred for hauling from the delivery point to transformer installation site, nor replacement of parts removed for shipping including oil, unless buyer chooses to purchase optional items quoted on section I of this proposal. It may be necessary to remove these items to meet shipping dimensions and weight requirements.

This quotation does not include any supervision of start-up, operator training, maintenance, subsequent inspection visits, nor interconnection diagrams to external equipment, relay studies, harmonic and transient calculations.

If additional Technical Consulting Service is desired by the Buyer (at his option) for receiving, installation and inspection, Buyer will be charged $1,750.00 per 8-hour day, plus travel expenses; 50% Premium over standard if required on overtime (past 8 hour day) and Saturdays; 100% Premium over standard on Sundays and Holidays.

Please refer to the enclosed documents for more details on installation, off-loading and technical consulting.

Assembly, Vacuum Filling, and Field Tests, quoted in section 1, consist of the following: accessories mounting, internal connections, drying process, vacuum oil filling, and field tests.

Job will be performed continuously without dead time. The job will begin once the transformer is placed in its permanent position, and does not include connections to other equipment or control room. Energization is not included.

The required energy is 220V, 3Ph, 50 Amp for the vacuum and degassing equipment. This will need to be provided by the customer, therefore, it is not included in the job scope. It needs to be accessible at a distance no longer than 15 m (49.2 ft).

No training, future maintenance or following visits are included.

The customer must provide 24 hours site access 7 days a week for the GE Prolec team to perform the job.

The customer must assure there is enough space for crane handling and temporal storage for the oil and accessories. In case of extra costs incurred for obstruction while performing maneuvers or crane, oil tanker or platform access, these will be borne by the customer.

Any expense associated with dismantling, transportation, temporal power supply, or reinstalling customer's products, is excluded from the scope and will remain the customer's responsibility.

The customer shall provide all required accessories (according to the outline drawing) at the place where the mounting will be performed in a timely manner. In the case this is not accomplished, demurrage charges can be placed on the customer.

V. VALIDITY PERIOD:

This proposal will remain valid for a period of 30 days after submittal.

If during this period we have an increment in the commodity cost (copper, silicon steel, oil and carbon steel), and transportation costs of more than 2%, then GE-Prolec will revise the price according this percent of increment.

The prices are subject to adjustment upward or downward to reflect changes in Copper, Carbon Steel, Silicon Steel and Oil between the date of the quotation or bid was made and the date of shipment. The adjustment shall be determined from the enclosed GE Prolec Price Adjustment Methodology, and will be reviewed in a quarterly basis.

VI. DELIVERY TERMS:

We are quoting these transformers F.O.B. Laredo, TX, with freight allowed to common carrier delivery point truck siding nearest the final destination in Kettle Valley, BC, Canada. Title Transfer and Risk of Loss will be transferred to Buyer on FOB point.

Dry Air Shipment.

Oil will be shipped F.O.B. Kettle Valley, BC, Canada, in an oil tanker truck.

Buyer shall notify their GE sales office when they are ready to place the order for the oil. GE sales office will contact GE-Prolec and provide a customer contact name and phone number for the Oil Supplier to make arrangements for the delivery of the oil with the Buyer. If the Buyer is not ready to receive the oil at the agreed time, any demurrage charges will be the responsibility of the Buyer. If the Oil Supplier does not deliver the oil at the agreed upon time the demurrage charges will be the responsibility of the Oil Supplier.

The seller will determine point of origin of shipment, method of transportation, carrier and routing to the port described above. If buyer specifies a manner or routing of shipment different from that determined by Seller, any additional expenses will be borne by Buyer.

The buyer shall bear complete responsibility for off-loading, any transportation beyond the delivery point, and installation of the transformer at the job site, unless buyer chooses to purchase options quoted on section I of this proposal.

Our shipping estimate will be 50 to 54 weeks after receipt of an order, which includes print approval. Our standard approval drawings will be mailed 20 to 24 weeks after receipt of the order with two weeks review period for the customer including mail.

Actual shipment and drawing schedules will depend on factory backlog at the time of the purchase order acceptance. Shipment dates are approximate and are based upon prompt receipt of all necessary information from Buyer.

Storage, if necessary, will be at the risk and expense of the buyer.

One Installation, Operation and Maintenance manual will be provided with the shipment of equipment in a 3-ring binder, and is not submitted for Buyer approval.

VII. PAYMENT TERMS:

20% as a down payment when the order is placed.
15% due with the submittal of the approval drawings.
20% due when the core and coil assembly have been completed.
35% due when the unit is ready for shipment.

10% due when the transformer arrives at the site, not to exceed 60 days from date of shipment.

VIII. TERMS AND CONDITIONS:

There will be a 1.5% charge per month of the total invoice price beginning 30 days after the date of the invoice, but the amount shall not be in excess of the applicable usurious rate.

The sale of any product or service by GE-Prolec is expressly conditioned upon Buyer's assent to the terms ES104 (Rev 2) and GPTC (Rev 3) contained herein. Any additional or different terms proposed by Buyer are expressly objected to and will not be binding upon GE-Prolec unless specifically agreed in writing by GE-Prolec's authorized representative.

IX. CANCELLATION CHARGES:

Cancellation Charges:	Cancellation Charges as a % of the Selling Price
Within 1 week after order entry	10
Within 3 weeks after order entry	15
Before job is released to the factory	20
1 week after release to the factory	65
2 weeks after release to the factory	70
3 weeks after release to the factory	90
4 weeks after release to the factory	100

X. WARRANTY:

The terms of the seller's standard warranty are set out on ES104 Rev. 2. All products of the seller are sold subject to this standard warranty. Note, if customer purchases installation as quoted in section I of this proposal, warranty period will be extended for two additional years.

Any expenses associated with dismantling, transporting, providing temporary power, or reinstalling products of the seller are excluded from the liability of the seller and will be the responsibility of the buyer.

Important: In order to preserve the agreed warranty of your transformer, the following information related to it's assembly and operation must be provided to GE Prolec: 1) Baseline DGA (Dissolved Gas Analysis) results to be obtained once the assembly process is completed; 2) The installation datasheet included in Appendix A, Section XV, Page 27 of the installation and operation manual. 3) The periodic DGA (Dissolved Gas Analysis) results to be obtained as per the recommendations made in the Appendix A Table I "Maintenance Inspections", and Table IV "Recommended test programs for in service transformers" of the installation and operation manual. The information shall be sent by fax to the GE Prolec Product Service Department.

XI. GENERAL INFORMATION:

- Special tools are not required for installation.
- Site testing procedure will be provided at time of shipment in the form of an instruction manual.
- Transformers are tested according to ANSI Standard Test Code for Transformers C57.12.90
- Short circuit tests or test reports are not included in this quotation.
- Referenced documents that are not included with this proposal, will be as per our original proposal.

We appreciate the opportunity to provide you with this offer, and are willing to discuss any issues and resolve them on a mutually acceptable basis as you progress through your bid evaluation.

Yours truly,

Erin McKinley
For Steve Cordick
Account Manager
GE Energy Services

PROLEC

Power Transformer Price Adjustment Methodology

Proprietary and Confidential

Weighting Factors	
Commodity	**Percent of Transformer Price**
Silicon Steel	25.0%
Copper	15.0%
Carbon Steel	8.0%
Oil	7.0%
Other Components	45.0%
Total	**100.0%**

Commodity Index References:

Core Steel: Due to its uniqueness, the index will be GE-Prolec core steel market price.
Copper: COMEX
Carbon Steel: Midwest Hot-Rolled sheet
Oil: WTI

Notes

1.- "Other Components" costs include other materials, labor, overhead, freight cost and margin. This cost component will not be adjusted.
2.- All indexes will be calculated on a monthly basis an released on the 15th of each month.

Price adjustment Multiplier Calculation Example

Weighting =>	*25.00%*	*15.00%*	*8.00%*	*7.00%*	Price
	Silicon Steel	**Copper**	**Carbon Steel**	**Oil**	**Adjustment**
		1.2897	**671.0000**	**41.4400**	
2004 (base)	1.0000	1.0000	1.0000	1.0000	
Jan-05	1.1188	1.1242	1.0760	1.1303	**1.0635**
Feb-05	1.2147	1.1370	1.0267	1.1576	**1.0874**
Mar-05	1.2027	1.1528	1.0103	1.3076	**1.0960**
Apr-05	1.2554	1.1579	0.9158	1.2785	**1.1003**
May-05	1.2740	1.1475	0.8871	1.2026	**1.0958**
Jun-05	1.2825	1.2575	0.8214	1.3599	**1.1202**
Jul-05	1.3153	1.2655	0.7392	1.4236	**1.1275**
Aug-05	1.2603	1.3308	0.6982	1.5682	**1.1303**
Sep-05	1.2577	1.3597	0.8378	1.5827	**1.1462**
Oct-05	1.2744	1.4755	0.9035	1.5024	**1.1674**
Nov-05	1.2538	1.5595	0.9035	1.4076	**1.1682**
Dec-05	1.2582	1.6845	0.9035	1.4337	**1.1898**
Jan-06	1.5414	1.6923	0.9035	1.5802	**1.2721**
Feb-06	1.6808	1.7452	0.9035	1.4872	**1.3084**
Mar-06	1.8215	1.8018	0.9035	1.5117	**1.3538**
Apr-06	1.8998	2.3005	0.9446	1.6758	**1.4629**
May-06	1.8916	2.9143	0.9528	1.7096	**1.5559**
Jun-06	1.9208	2.6335	1.0185	1.7082	**1.5263**
Jul-06	1.9225	2.8093	1.0349	1.7956	**1.5605**
Aug-06					
Sep-06					
Oct-06					
Nov-06					
Dec-06					

* Oil: WTI http://tonto.eia.doe.gov/dnav/pet/pet_pri_spt_s1_d.htm
* Copper: COMEX http://www.nymex.com/cop_fut_histspot.aspx
* Steel: CRU http://www.crumonitor.com
* Silicon Steel: GE Prolec Available from GE Prolec

FORM ES104 (REV 2): TERMS AND CONDITIONS FOR SALE AND LEASE OF PRODUCTS AND SERVICES

NOTICE: Sale or Lease of any Products or Services is expressly conditioned on Buyer's assent to these Terms and Conditions. Any additional or different terms proposed by Buyer are expressly objected to and will not be binding upon Seller unless agreed to in writing by Seller; provided however, that no pre-printed facility entry form shall modify these Terms and Conditions even if signed by Seller's representative. Any oral or written representation, warranty, course of dealing or trade usage not contained in these Terms and Conditions or the Contract shall not be binding on either party. Any order to perform work and Seller's performance of work shall constitute Buyer's assent to these Terms and Conditions. Unless otherwise specified in the quotation or Contract, any quotation by Seller shall expire 30 days from its date and may be modified or withdrawn by Seller before receipt of Buyer's acceptance.

1. **Definitions.** Unless Seller otherwise agrees:
"Buyer" means the entity to which Seller is providing Products or Services under the Contract.
"Contract" means the documents that comprise the agreement between Buyer and Seller for the sale or lease of Products or Services, including these Terms and Conditions and any other documents incorporated therein by reference, such as, the final quotation, the agreed scope(s) of work, and Seller's order acknowledgement.
"Hazardous Materials" means any chemical, substance, material or emission that is or may be regulated, governed, listed or controlled pursuant to any international, national, federal, provincial, state or local statute, ordinance, order, directive, regulation, judicial decision or other legal requirement applicable to the Site as a toxic substance, hazardous substance, hazardous material, dangerous or hazardous waste, dangerous good, pesticide, radioactive material, regulated substance or any similar classification, or any other chemical, substance, emission or material, including, without limitation, petroleum or petroleum-derived products or by-products, regulated, governed, listed or controlled or as to which liability is imposed on the basis of potential impact to safety, health or the environment pursuant to any legal authority of Canada or the country of the Site.
"Leased Equipment" means all Products Seller has agreed to lease to Buyer under the Contract, as well as all equipment of Seller which will be located at the Site during all or some portion of the term of the Contract without Seller's personnel present, such as remote diagnostic equipment.
"Products" means all equipment, parts, materials, supplies, software, and other goods Seller has agreed to supply to Buyer under the Contract, including Leased Equipment and Refurbished Parts.
"Refurbished Parts" means used Products that have been repaired and/or reconditioned by Seller for resale.
"Seller" means the entity providing Products or performing Services under the Contract.
"Services" means all services Seller has agreed to perform for Buyer under the Contract.
"Site" means the premises where Products are delivered or Services are performed, not including Seller's premises from which it performs remote Services.
"Terms and Conditions" means these Terms and Conditions for Sale and Lease of Products and Services.

2. **Payment.** Except as otherwise agreed to by Seller in writing, and upon approved credit, the following payment terms apply:
2.1 Buyer shall pay Seller all invoiced amounts in Canadian dollars, without right of set-off, within 30 days from date of invoice. Seller shall be entitled to payment of all charges associated with Seller's performance of Services as the Services are performed. For each Product with a price of $500,000 or more, partial payments of the contract price shall be made as invoiced starting upon order placement, such that 80% of the Contract price is received before scheduled shipment. Buyer shall pay a monthly late payment charge computed at the rate of 1.5% or the maximum interest rate permitted by applicable law, whichever is less, on any past-due amount for each calendar month (or fraction thereof) that the payment is overdue and all costs of Seller's collection efforts including reasonable attorney's fees.
2.2 Unless otherwise agreed in the Contract, in any transaction in which Buyer and Seller are domiciled in separate countries, Buyer shall establish an irrevocable, unconditional, sight letter of credit allowing for pro-rata payments for partial deliveries, storage, export shipment, price adjustments, cancellation or termination, and all other payments due from Buyer under the Contract and certification of the charges and grounds for such payment. The letter of credit shall be (a) confirmed by a bank that is acceptable to Seller, (b) payable at the counters of the confirming bank and (c) opened sixty (60) days prior to the earliest scheduled shipment and (c) remain in effect until ninety (90) days after the latest scheduled shipment. Buyer shall pay all banking charges. Seller will not begin performance until the letter of credit becomes operative. Buyer will increase the amounts and/or extend the validity period(s) and make appropriate modifications to any letter of credit within five business days of Seller's notification that such increase or extension is necessary to provide for payments to become due.
2.3 If at any time Seller reasonably determines that Buyer's financial condition does not justify the continuation of Seller's performance, Seller may require full or partial payment in advance or shall be entitled to suspend or terminate the Contract.

3. **Taxes and Duties.** Unless otherwise specified in the Contract, Seller shall be responsible for and pay directly, all corporate and individual taxes measured by net income or profit imposed by any governmental authority on Seller, its employees or subcontractors due to the execution of any agreement or the performance of or payment for work hereunder ("Seller Taxes"). Buyer shall be responsible for and pay directly when due and payable all taxes, duties, fees, or other charges of any nature (including, but not limited to, ad valorem, consumption, excise, franchise, gross receipts, import, license, property, sales, stamp, storage, transfer, turnover, use, or value-added taxes, and any and all items of withholding, deficiency, penalty, addition to tax, interest, or assessment related thereto), other than Seller Taxes, imposed by any governmental authority on Seller or its employees or subcontractors due to the execution of any agreement or the performance of or payment for work hereunder ("Buyer Taxes"). All payments due and payable by Buyer to Seller hereunder shall be made in the full amount of the Contract price, free and clear of all deductions and withholding for Buyer Taxes. If Buyer deducts or withholds Buyer Taxes, Buyer shall pay additional amounts to Seller to cause the amounts Seller actually receives, net of deducted or withheld Buyer Taxes, to equal the full Contract price. Buyer shall provide to Seller within one month accurate official receipts from the appropriate governmental authority for deducted or withheld taxes.

4. **Delivery; Title Transfer; Risk of Loss; Storage.** 4.1 For shipments within the country of origin or manufacture and for U.S. exports, Seller shall deliver Products to Buyer EXW Seller's facility, place of manufacture or warehouse (Incoterms 2000). For all other export shipments, Seller shall deliver Products to Buyer FCA Port of Export (Incoterms 2000). Buyer shall pay all delivery costs and charges or reimburse Seller for shipping charges plus 25%. Except for those obligations that are consistent with Incoterms 2000 specifically stated above, Seller shall not be liable in any claim asserted by Buyer with respect to delivery. Partial deliveries will be permitted. If Products delivered do not correspond in quantity, type or price to those itemized in the invoice for the shipment, Buyer will so notify Seller within 10 days after receipt. Seller may deliver any or all Products in advance of the delivery schedule. Delivery times are approximate and are dependent upon prompt receipt by Seller of all materials and information necessary to proceed with the work without interruption.
4.2 Title to Products shipped from Canada shall pass EXW Seller's facility, place of manufacture or warehouse (INCOTERMS 2000). Title to Products shipped from the U.S. shall pass to Buyer immediately after each item departs from the territorial land, seas and overlying airspace of the U.S. For this purpose, the parties acknowledge that the territorial seas of the U.S. extend to twelve nautical miles from the baseline of the country determined in accordance with the 1982 United Nations Convention of the Law of the Sea. Title to Products shipped from within the country where Products will be installed shall pass to Buyer when Products are made available for shipment from the manufacturer's factory or the storage facility utilized by Seller. Title to Products shipped directly from a European Union ("EU") manufacturer or a EU storage facility outside the country where the Product will be installed shall pass to Buyer the earlier of (i) the port of export immediately after the Products have been cleared for export or (ii) immediately after each item departs from the territorial land, seas and overlying airspace of the EU sending country. Title to Products to be shipped from any other country shall pass to Buyer at the port of export immediately after the Products have been cleared for export. Title to Services shall pass to Buyer as performed. Notwithstanding the foregoing, for any software provided by Seller hereunder, only the license to the software transfers as set forth herein, and title to Leased Equipment shall remain at all times with Seller.
4.3 Notwithstanding Section 4.1 above, in all events risk of loss shall transfer to Buyer upon title passage.
4.4 If any Products cannot be shipped to or received by Buyer when ready due to any cause not attributable to Seller, Seller will notify Buyer and then may ship Products to a storage facility, including a facility within the place of manufacture, or to an agreed freight forwarder. If Seller places Products in storage or if Products are detained at any port, the following conditions shall apply: (i) title and all risk of loss or damage shall immediately pass to Buyer if they had not already passed; (ii) any amounts otherwise payable to Seller upon delivery or shipment shall be payable upon presentation of Seller's invoices; (iii) all expenses and charges incurred by Seller, such as for preparation for and placement into storage, handling, inspection, preservation, insurance, storage, demurrage, removal and any taxes shall be payable by Buyer upon submission of Seller's invoices; and (iv) when conditions permit and upon payment of all amounts due hereunder, Seller shall resume delivery of Products to the originally agreed point of delivery.
4.5 Buyer shall bear the sole risk of loss for Buyer's equipment during the term of the Contract, whether at the Site, the Seller's facility or in transit from the Seller's facility. If repair Services are to be performed on Buyer's equipment at Seller's facility, Buyer shall be responsible for transporting the equipment to and from Seller's facility. Buyer shall reimburse Seller at Seller's then current storage rate if the equipment remains at Seller's facility beyond 10 days after notification that the Services have been completed.

5. **Excusable Delays.** Seller shall not be liable nor in breach or default of its obligations under the Contract to the extent performance of such obligations is delayed or prevented, directly or indirectly, due to causes beyond its reasonable control, including, but not limited to, acts of God, fire, terrorism, war (declared or undeclared), epidemics, material shortages, insurrection, acts (or omissions) of Buyer or Buyer's suppliers or agents, any act (or omission) by any governmental authority, strikes, labor disputes, transportation shortages, or vendor non-performance. The delivery or performance date shall be extended for a period equal to the time lost by reason of delay, plus such additional time as may be reasonably necessary to overcome the effect of the delay. If Seller is delayed by any acts (or omissions) of Buyer, or by the prerequisite work of Buyer's other contractors or suppliers, Seller shall be entitled to an equitable price and performance adjustment.

6. **Compliance with Laws, Codes and Standards.** 6.1 Seller represents that the Products will be produced in compliance with applicable employment standards laws, occupational safety and health laws, and provincial human rights laws.
6.2 The Contract price, delivery and performance dates and any performance guarantees will be equitably adjusted to reflect additional costs or obligations incurred by Seller resulting from a change in industry specifications, codes, standards, applicable laws or regulations.
6.3 Seller's obligations are conditioned upon Buyer's compliance with all applicable trade control laws and regulations. Buyer shall not transship, re-export, divert or direct Products other than in and to the ultimate country of destination specified on Buyer's order or declared as the country of ultimate destination on Seller's invoice, except as permitted by applicable laws and regulations.
6.4 Notwithstanding any other provisions, Buyer shall timely obtain any required authorization, such as an export license, import license, foreign exchange permit, work permit or any other governmental authorization, even if Seller applies for the authorization. Buyer shall be solely responsible for obtaining, maintaining and/or effectuating any governmental authorizations or notifications, including, without limitation, the submission and approval of a spill prevention and control plan, oil processing notification, and required air permit modifications, if any, required for the lawful performance of the Services at the Site.

7. **Warranty.** 7.1 Seller warrants to Buyer that (i) the Products shall be shipped free from defects in material, workmanship and title and (ii) the Services shall be performed in a competent, diligent manner in accordance with any mutually agreed specifications. Unless Seller expressly agrees otherwise in writing, any items not manufactured by Seller (including incidental materials and consumables used in the Services) shall carry only the warranty that the original manufacturers provide, and Seller gives no warranty on behalf of the manufacturers of such items. Furthermore, used Products other than Refurbished Parts shall be sold "as is."
7.2 Unless otherwise stated in the Contract, the warranty period for Products shall be one year from first use or 18 months from delivery, whichever occurs first, except that software and baghouses, precipitators and other particulate collection equipment are warranted for 90 days from delivery. If Services include installation or direction of installation of heavy duty gas and steam turbine parts, the warranty period for each such part shall be one year after completion of installation or four years from the date of delivery, whichever occurs first. Unless otherwise stated in the Contract, the warranty period for Services shall be one year from completion, except for software related Services, which shall have a warranty period of 90 days from completion, and repair Services, which shall have warranty periods as follows: centrifuges and underground mine equipment – 30 days; pumps, compressors, instrumentation, communication, x-ray and control devices – 90 days; and other mechanical equipment – 180 days.
7.3 If Products or Services do not meet the above warranties, Buyer shall promptly notify Seller in writing within the warranty period. Seller shall thereupon (i) at Seller's option, repair or replace the defective Products or (ii) re-perform the defective Services. If in Seller's reasonable judgment the Product cannot be repaired or replaced or the Services cannot be re-performed, Seller shall refund or credit monies paid by Buyer for that portion of Products or Services that do not meet the above warranties. Any repair, replacement or reperformance by Seller hereunder shall not extend the applicable warranty period. The parties shall mutually agree on the specifications of any test to determine the presence of a defect.
7.4 Buyer shall bear the costs of access (including removal and replacement of systems, structures or other parts of Buyer's facility), de-installation, decontamination, re-installation and transportation of Products to Seller and back to Buyer.
7.5 These warranties and remedies are conditioned upon (a) the proper storage, installation, operation, and maintenance of the Products and conformance with the proper operation instruction manuals provided by Seller or its suppliers or subcontractors, (b) Buyer keeping proper records of operation and maintenance during the warranty period and providing Seller access to those records, and (c) modification or repair of the Products or Services only as authorized by Seller. Seller does not warrant the Products or any repaired or replacement parts against normal wear and tear or damage caused by misuse, accident, or use against the advice of Seller. Any modification or repair of any of the Products or Services not authorized by Seller shall render the warranty null and void.
7.6 This Article provides the exclusive remedies for all claims based on failure of or defect in Products or Services, whether the failure or defect arises before or during the applicable warranty period and whether a claim, however described, is based on contract, warranty, indemnity, tort/extracontractual liability (including negligence), strict liability or otherwise. The warranties provided in this Article are exclusive and are in lieu of all other warranties, conditions and guarantees whether written, oral, implied or statutory. NO IMPLIED STATUTORY WARRANTY OR CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE APPLIES.

8. **Limitation of Liability.** 8.1 The total liability of Seller for all claims arising out of or relating to the performance or breach of the Contract or use of any Products or Services or any order shall not exceed (a) the Contract price or (b) if this Contract is in the form of a frame or master agreement under which Buyer places an order with Seller for the Products and Services to be purchased, (i) the final price of the particular order under which the specific Products or Services giving rise to the claim are supplied or performed or (ii) ten thousand Canadian dollars ($10,000) if the claim is not part of any particular order. Seller's liability shall terminate upon the expiration of the applicable warranty period, provided that Buyer may enforce a claim that accrued prior to that date by commencing an action or filing an arbitration, as applicable under the dispute resolution clause, before the expiration of the applicable statute of limitations or repose, but not later than two years after the expiration of such warranty period.
8.2 Seller shall not be liable for loss of profit or revenues, loss of product, loss of use of Products or Services or any associated equipment, interruption of business, cost of capital, cost of cover, downtime costs, increased operating costs, claims of Buyer's customers for such damages, or for any special, consequential, incidental, indirect, punitive or exemplary damages.
8.3 If Buyer is supplying Seller's Products or Services to a third party, Buyer shall require the third party to agree to be bound by this Article. If Buyer does not obtain this agreement for Seller's benefit, Buyer shall indemnify, defend and hold Seller harmless from and against any and all claims made bythe third party in excess of the limitations and exclusions of this Article.
8.4 Seller shall not be liable for any advice or assistance that is not required under the Contract.
8.5 For the purposes of this Article, the term "Seller" shall mean Seller, its affiliates, related entities, subcontractors and suppliers of any tier, and their agents and employees, individually or collectively. Buyer agrees that the foregoing entities and persons (except Seller) shall be considered third party beneficiaries of the provisions of this Article 8 and shall be entitled to rely on its provisions as a defense or enforce such provisions directly. If for any reason applicable law does not permit such direct enforcement or reliance, Buyer agrees that Seller may enforce these provisions on behalf of such entities or persons. Seller is contracting in this Article 8 as trustee for such entities and persons.
8.6 The limitations and exclusions in this Article shall apply regardless of whether a claim is based in contract, warranty, indemnity, tort/extracontractual liability (including negligence), strict liability or otherwise.
8.7 Buyer's and Seller's rights, obligations and remedies arising out of or relating to the Products or Services are limited to those rights, obligations and remedies described in this Contract. This Article shall prevail over any conflicting or inconsistent terms in the Contract, except to the extent that such terms further restrict Seller's liability and shall survive termination or expiration of this Contract for any reason.

9. **Dispute Resolution, Governing Law.** 9.1 Any dispute arising out of or in connection with the Contract, including any question regarding its existence, validity or termination, shall be resolved in accordance with this paragraph and will be settled, if possible, by negotiation of the parties. If a dispute is not resolved by negotiations, either party may, by giving written notice, refer the dispute to a meeting of appropriate higher management of each party, to be held within twenty (20) business days after giving notice. If the dispute is not resolved within thirty (30) business days after the date of the meeting of higher management, or any later date to which the parties may agree, either party may submit to arbitration or court depending on Buyer's pertinent place of business, as follows:
(a) If Buyer's pertinent place of business is in a country other than Canada or the U.S., the dispute shall be referred to and finally resolved by arbitration under the London Court of International Arbitration ("LCIA") Rules, which are incorporated by reference into this clause. The number of arbitrators shall be one unless the amount in dispute exceeds the equivalent of U.S. $1,000,000, in which event it shall be three. When three arbitrators are involved, each party shall appoint one arbitrator, and those two shall appoint the third within thirty (30) days, who shall be the Chairman. The single arbitrator or the Chairman may not be a national or resident of the country of the Site or the countries in which either party is organized or has its principal place of business, unless both parties otherwise agree. The seat, or legal place, of arbitration shall be London, England. The arbitration shall be conducted in English. In reaching their decision, the arbitrators shall give full force and effect to the intent of the parties as expressed in the Contract, and if a solution is not found in the Contract, shall apply the governing law of the Contract. The decision of the arbitrator shall be final and binding upon both parties, and neither party shall seek recourse to a law court or other authority to appeal for revisions of the decision.
(b) If Buyer's pertinent place of business is in the U.S., any claim, legal action or proceeding (including without limitation claims for set-off or counterclaim) regarding the dispute shall be brought in the U.S. District Court for the Northern District of Georgia, or in the event that court lacks jurisdiction to hear the claim, in the appropriate state courts of Cobb County, Georgia, and the parties

irrevocably consent to the exclusive jurisdiction of those courts for such claims. Each party submits to and accepts generally and unconditionally the jurisdiction of those courts with respect to its person and property, and irrevocably consents to the service of process in connection with any such action or proceeding by personal delivery to the party or by registered or certified mail, postage prepaid, to its address for notice under the Contract.

(c) If Buyer's pertinent place of business is in Canada, any claim, legal action or proceeding (including without limitation claims for set-off or counterclaim) regarding the dispute shall be brought in the Ontario Courts, and the parties irrevocably consent to the exclusive jurisdiction of those courts for such claims. Each party submits to and accepts generally and unconditionally the jurisdiction of those courts with respect to its person and property, and irrevocably consents to the service of process in connection with any such action or proceeding by personal delivery to the party or by registered or certified mail, postage prepaid, to its address for notice under the Contract.

9.2 Notwithstanding the terms above, each party has the right at any time, at its option and where legally available, to commence an action or proceeding in a court of competent jurisdiction to apply for interim or conservatory measures, but not monetary damages.

9.3 The validity, performance and all matters relating to the interpretation and effect of the Contract and all further documents executed pursuant to it shall be construed and interpreted in accordance with the laws, excluding the rules on the conflict or choice of laws, of (i) the Province of Ontario, if the Buyer has its pertinent place of business in Canada, or (ii) England and Wales if the Buyer has its pertinent place of business outside of Canada If the Contract includes the sale of Products and the Buyer has its pertinent place of business outside of Canada, the United Nations Convention on Contracts for the International Sale of Goods shall apply.

10. **Confidentiality.** 10.1 In connection with the Contract, Seller and Buyer (as to information disclosed, the "Disclosing Party") may each provide the other party (as to information received, the "Receiving Party") with "Confidential Information." "Confidential Information" means (a) all pricing for Products and Services, (b) all terms of the Contract, (c) all information that is designated in writing as "confidential" or "proprietary" by the Disclosing Party at the time of written disclosure, and (d) all information that is orally designated as "confidential" or "proprietary" by the Disclosing Party at the time of oral disclosure and is confirmed to be "confidential" or "proprietary" in writing within 10 days after oral disclosure. The obligations of this Article shall not apply as to any portion of the Confidential Information that: (i) is or becomes generally available to the public other than from disclosure by the Receiving Party, its representatives or its affiliates; (ii) is or becomes available to the Receiving Party or its representatives or affiliates on a non-confidential basis from a source other than the Disclosing Party when the source is not, to the best of the Receiving Party's knowledge, subject to a confidentiality obligation to the Disclosing Party; (iii) is independently developed by the Receiving Party, its representatives or affiliates, without reference to the Confidential Information; (iv) is required to be disclosed by law, a valid legal process or a government agency; or (v) is approved for disclosure in writing by an authorized representative of the Disclosing Party.

10.2 The Receiving Party agrees: (i) to use the Confidential Information only in connection with the Contract and permitted use(s) and maintenance of Products and Services, (ii) to take reasonable measures to prevent disclosure of the Confidential Information, except to its employees, agents or financing parties who have a need to know for Buyer to perform its obligations under the Contract or to use and maintain Products or Services, and (iii) not to disclose the Confidential Information to a competitor of the Disclosing Party. The Receiving Party agrees to obtain a commitment from any recipient of Confidential Information to comply with the terms of this Article. Confidential Information shall not be reproduced without the Disclosing Party's written consent, and the Receiving Party shall return all copies of Confidential Information to the Disclosing Party upon request except to the extent that the Contract entitles the Receiving Party to retain the Confidential Information. Seller may also retain one copy of Buyer's Confidential Information until all its potential liability under the Contract terminates.

10.3 If either party or any of its affiliates or representatives is required by law, legal process or a government agency to disclose any Confidential Information, that party agrees to provide the Disclosing Party with prompt written notice to permit the Disclosing Party to seek an appropriate protective order or agency decision or to waive compliance by the Receiving Party with the provisions of this Article. In the event that efforts to secure confidential treatment are unsuccessful, Seller may lawfully revise the Confidential Information to make it nonproprietary or to minimize the loss of its proprietary value.

10.4 Nothing in this Article grants the Receiving Party any license under any invention, patent, trademark or copyright now or later owned or controlled by the Disclosing Party.

10.5 Buyer shall not disclose Confidential Information to Seller unless it is required to do so to enable Seller to perform work under the Contract. If Buyer does disclose Confidential Information, Buyer warrants that it has the right to disclose the information, and Buyer shall indemnify and hold Seller harmless against any claims or damages resulting from improper disclosure by Buyer.

10.6 As to any individual item of Confidential Information, the restrictions of this Article shall expire the earlier of five (5) years after the date of disclosure or three (3) years after termination or expiration of the Contract.

10.7 This Article does not supersede any separate confidentiality or nondisclosure agreement signed by the parties.

11. **Health and Safety Matters.** 11.1 Buyer shall take all necessary precautions, at all times, for the health and safety of Seller personnel at the Site. These include, but are not limited to: providing to Seller for review, and instructing Seller's personnel regarding, Buyer's safety practices; proper and safe handling of, and protection of Seller's personnel from exposure to, Hazardous Materials; energization and de-energization of all power systems (electrical, mechanical and hydraulic) using safe and effective lock-out/tag-out procedures; and conducting periodic safety meetings.

11.2 Seller may, from time to time, conduct safety audits to ensure the existence of safe site and working conditions and make recommendations to Buyer concerning them. Whether or not Seller conducts safety audits or makes recommendations, Buyer will remain responsible for providing a work environment that is safe and that complies with all applicable legal requirements. Buyer will make its local medical facilities and resources available to Seller personnel who need medical attention, for the duration of their needs. Under no circumstance will Seller personnel be required to work more than any maximum time periods allowed by applicable law.

11.3 If, in Seller's reasonable opinion, the safe execution of the Contract at the Site is, or is apt to be, imperiled by security concerns, local conditions, war (declared or undeclared), armed conflict or threatened conflict, civil unrest, terrorist acts or threats, threat to safety or well-being of the Site or personnel or Seller's persons or interests, the presence of or threat of exposure to Hazardous Materials, or unsafe working conditions, Seller may, in addition to other rights or remedies available to it, evacuate some or all of its personnel from the Site, suspend performance of all or any part of the Contract, and/or transfer such performance and supervise it at a location solely determined by Seller. Buyer shall assist in any evacuation. Any delay that results shall be considered excusable.

11.4 Before issuing its purchase order, Buyer shall advise Seller in writing of all applicable Site-specific rules, regulations, safety codes, and laws that apply to Products and Services.

11.5 Operation of Buyer's equipment is the responsibility of Buyer. If Buyer requires or permits Seller's personnel to operate Buyer's equipment at the Site, Buyer shall indemnify and save Seller, its employees and agents, harmless from expense and liability (including reasonable attorneys' fees) incurred by or imposed upon Seller, its employees and agents, based upon exposure to Hazardous Materials, injury to persons (including death) or damage to property resulting from operation of equipment at the Site by Seller personnel. Buyer shall not require Seller personnel to work on other projects or equipment during the term of the Contract.

12. **Site Access and Conditions; Hazardous Materials.** 12.1 Buyer shall provide Seller access to the Site and any other facilities free of charge, including the operating and development environment and information, as necessary for Seller's performance of the Contract. Prior to Seller starting any work at the Site, Buyer will (i) provide documentation that identifies any existing Hazardous Materials on or about the Site, and (ii) allow Seller, at its option, access to the Site to perform or have performed a Site evaluation, including without limitation, a review of applicable documents and visual examination of the Site. Whether or not Seller conducts any evaluation, Seller will have no responsibility or liability for existing Site conditions.

12.2 Seller shall promptly, and, if feasible, before such conditions are disturbed, notify Buyer in writing of: (i) subsurface, latent physical or other conditions at the Site, including but not limited to Buyer's health and safety requirements, differing materially from those indicated in the Contract or otherwise disclosed by Buyer, and (ii) previously unknown physical conditions at the Site, including archeological remains, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract. Buyer shall promptly investigate those conditions. If it is determined that any conditions do materially differ and cause an increase in Seller's cost of, or the time required for, performance of any part of the work under the Contract, the parties shall make an equitable adjustment in price and schedule and modify the Contract in writing accordingly.

12.3 If, at the Site, Seller encounters Hazardous Materials that require special handling or disposal, Buyer shall immediately take whatever precautions are required to eliminate legally the hazardous conditions so that the work under the Contract may safely proceed. Seller shall not be obligated to commence or continue work until Buyer causes the hazardous conditions to be removed. If any such Hazardous Materials cause an increase in Seller's cost of or time required for performance of any part of the work, the parties shall make an equitable adjustment to the price and schedule and modify the Contract in writing accordingly. Buyer agrees to properly store, transport and dispose of all Hazardous Materials introduced, produced or generated in the course of Seller's work at the Site.

12.4 Buyer shall indemnify and hold Seller harmless for any and all claims, damages, losses, causes of action, demands, judgments and expenses arising out of or relating to any Hazardous Materials which are or were (i) present on or about the Site prior to the commencement of Seller's work, (ii) improperly handled or disposed of by Buyer or Buyer's employees, agents, contractors or subcontractors, or (iii) brought, generated, produced or released on the Site by parties other than Seller.

13. **Termination and Suspension.** 13.1 Buyer may terminate the Contract (or any portion thereof) for cause if Seller: (i) substantially breaches a material obligation which does not otherwise have a specified contractual remedy, provided that: (a) Buyer shall first provide Seller with detailed written notice of the breach and of Buyer's intention to terminate the Contract, and (b) Seller shall have failed, within 30 days after receipt of the notice (or such extended period as is considered reasonable by the parties), to either (1) commence and diligently pursue cure of the breach, or (2) provide reasonable evidence that the breach has not occurred; or (ii) becomes insolvent, makes an assignment for the benefit of its creditors, has a receiver or trustee appointed for the benefit of its creditors, or files for protection from creditors under any bankruptcy or insolvency laws. If Buyer terminates the Contract as provided in this Section: (a) Buyer shall pay to Seller all portions of the Contract price allocable to work performed (for example, the price for Products completed or partially completed before the termination), Lease Fees incurred, and all Services performed at the Seller's then-current standard time and material rates; and (b) Seller shall pay Buyer the difference between that portion of the Contract Price allocable to the terminated scope and the actual amounts reasonably paid by Buyer to another supplier for that scope.

13.2 Seller shall have the right to suspend or terminate the Contract (or any portion thereof) immediately for cause if: (i) Buyer becomes insolvent, makes an assignment for the benefit of its creditors, has a receiver or trustee appointed for the benefit of its creditors, or files for protection from creditors under any bankruptcy or insolvency laws; (ii) there is an excusable delay (as per Section 5 above) lasting longer than 120 days; (iii) any representation or warranty made by Buyer herein or in any document or certificate furnished by Buyer in connection herewith proves to be incorrect in any material respect; or (iv) Buyer materially fails to comply with any terms of the Contract, including but not limited to, failure to make any payment when due or to fulfill any payment conditions.

13.3 If the Contract (or any portion thereof) is terminated for any reason other than those set forth in Section 13.1 above, Buyer shall pay Seller for all Products completed or partially completed, Lease Fees incurred, and Services performed before the effective date of termination, plus a cancellation charge equal to 15% of the Contract price allocable to the uncompleted Products, unfinished Lease Term and unperformed Services. The following shall apply when determining the amount due from Buyer for Services performed before the date of termination: (i) for Services performed under time and material pricing, Buyer shall pay for all hours performed at Seller's then-current standard time and material rates and (ii) for Services performed under a firm fixed price, Buyer shall pay (a) the applicable price for all milestones achieved and (b) for any milestone not yet achieved, all hours performed in connection with the unachieved milestone(s) at Seller's then-current standard time and material rates.

13.4 Buyer shall pay any reasonable expenses incurred by Seller in connection with a suspension or termination, including expenses for repossession, fee collection, demobilization/remobilization or costs of storage during suspension upon submission of Seller's invoice(s). Performance of Seller's obligations shall be extended for a period of time reasonably necessary to overcome the effects of any suspension.

14. **Software, Leased Equipment, Remote Environmental Services, Remote Diagnostic Services, PCB Services, EPC Services.** 14.1 If Seller provides any software to Buyer, the terms of this Contract shall apply including the Software License Addendum. If Seller leases any of Seller's equipment or provides related Services to Buyer, including placing Seller's equipment at Buyer's site to provide remote Services, the terms of this Contract shall apply including the Lease Agreement Addendum. If Seller provides any remote environmental Services to Buyer, the terms of this Contract shall apply including the Remote Environmental Services Addendum. If Seller provides any remote diagnostic services to Buyer, the terms of this Contract shall apply including the Remote Diagnostic Services Addendum. If Seller provides any PCB Services to Buyer, the terms of this Contract shall apply including the PCB Services Addendum. If Seller provides any EPC Services to Buyer, the terms of this Contract shall apply including the EPC Services Addendum. If there is any conflict between these terms and the terms of any applicable addendum, the terms of the addendum shall prevail.

14.2 If Seller performs Services related to Seller's own proprietary software, Buyer agrees that Seller owns all proprietary rights, including, but not limited to any patent, copyright, trade secret, trademark and other proprietary rights, in and to that software and any work derived from that software ("Derivative Work"). "Derivative Work" is (i) any work that is based upon one or more pre-existing work, such as a revision, enhancement, modification, translation, abridgement, condensation, expansion, extension or any other form in which such pre-existing work may be recast, transformed, or adapted, and that, if prepared without the authorization of the owner of the copyright to such pre-existing work, would constitute a copyright infringement and (ii) any compilation that incorporates such a pre-existing work. Buyer shall have only a "right to use" license to a Derivative Work for internal business purposes and shall not disclose, sell, lease, distribute, or otherwise transfer the Derivative Work to any third party except as may be permitted by these terms or as approved in writing by Seller.

14.3 For the purposes of this Article, "Seller" means Seller, its affiliates, and their successors or assigns.

15. **Intellectual Property Indemnification.** 15.1 Subject to the terms of the Contract, Seller shall indemnify Buyer against any damages, costs and expenses arising out of any suit, claim, or proceeding (a "Claim") alleging that Products or Services infringe a patent in effect in Canada, the U.S., an EU member state or country of delivery (provided there is a corresponding patent issued by the U.S. or an EU member state), or Canadian copyright or copyright registered in the country of delivery; provided that: (a) Buyer promptly notifies Seller in writing of any such Claim; (b) Buyer makes no admission of liability and gives Seller sole authority, at Seller's expense, to direct and control all defense, settlement, and compromise negotiations; and (c) Buyer provides Seller with full disclosure and assistance that may be reasonably required to defend any such Claim.

15.2 Seller shall have no obligation or liability with respect to any Claim based upon: (a) any Products or Services that have been altered, modified, or revised; (b) the combination, operation, or use of any Products or Services with other products when such combination is part of any allegedly infringing process; (c) failure of Buyer to implement any update provided by Seller that would have prevented the Claim; (d) unauthorized use of Products or Services, including, without limitation, a breach of the provisions of the Contract; or (e) Products or Services made or performed to Buyer's specifications.

15.3 Should any Product or Service, or any portion thereof, become the subject of a Claim, Seller may at its option (a) procure for Buyer the right to continue using the Product or Service, or portion thereof, (b) modify or replace it in whole or in part to make it non-infringing, or (c) failing (a) or (b), take back Products or Services and refund any fees received by Seller attributable to the infringing Product or Service.

15.4 This states Seller's entire liability for indemnification for patent, trademark, copyright, and trade secret infringement for Products and Services.

15.5 Notwithstanding the foregoing, with respect to any Products or Services, or portions thereof, which are not manufactured/developed by Seller, only the indemnity of the manufacturer/developer, if any, shall apply.

16. **Changes.** 16.1 Each party may at any time propose changes in the schedule or scope of Products or Services in the form of a draft change order. Some changes requested by Buyer may require analytical or investigative work to evaluate the change, and this evaluation work may be charged to Buyer at prevailing rates. The parties may mutually agree on the length of time within which a decision shall be made regarding the change. If mutually agreed, the changes will be documented in a written document signed by authorized representatives of each party, along with any equitable adjustments in the Contract price or schedule. Seller is not obligated to proceed with the changed schedule or scope until both parties agree in writing. Changes in applicable laws, rules and regulations shall be treated as a change within the meaning, and subject to the requirements, of this Article. Unless otherwise agreed by the parties, pricing for additional work arising from changes in laws, rules and regulations shall be at time and material rates.

16.2 All Products delivered shall conform to Seller's part or version number specified or (at Seller's option) its equivalent or the superseding number subsequently assigned by Seller. If the number ordered is no longer available, Seller is authorized to ship a valid interchangeable Product without notice to Buyer.

17. **Inspection and Factory Tests.** The quality control exercised by Seller in its manufacture of Products shall be in accordance with Seller's normal quality control policies, procedures and practices. Seller shall attempt to accommodate Buyer's requests to witness Seller's factory tests of Products, if such witnessing can be arranged without delaying the work. Such access shall be limited to areas directly concerned with Products ordered by Buyer and shall not include restricted areas where development work or work of a proprietary nature is being conducted.

18. **General Clauses.** 18.1 Products and Services sold by Seller are not intended for use in connection with any nuclear facility or activity without the written consent of Seller. Buyer warrants that it shall not use or permit others to use Products or Services for such purposes, unless Seller agrees to the use in writing. If, in breach of this, any such use occurs, Seller (and its parent, affiliates, suppliers and subcontractors) disclaims all liability for any nuclear or other damages, injury or contamination, and in addition to any other legal or equitable rights of Seller, Buyer shall indemnify and hold Seller (and its parent, affiliates, suppliers and subcontractors) harmless against any such liability. If Seller agrees in writing to any such use, the parties shall agree upon special terms and conditions that provide Seller protections against nuclear liability and which are acceptable to Seller under the then current laws that apply.

18.2 Seller may assign or novate its rights and obligations under the Contract, in part or in whole, to any of its affiliates without Buyer's consent, and may subcontract portions of the work, so long as Seller remains responsible for it. Buyer agrees to execute any documents that may be necessary to effect Seller's assignment or novation. The delegation or assignment by Buyer of any or all of its duties or rights under the Contract without Seller's prior written consent shall be void.

18.3 Buyer shall notify Seller immediately upon any change in the ownership of more than fifty percent (50%) of Buyer's voting rights or in Buyer's controlling interest. If Buyer fails to do so or Seller objects to the change, Seller may (a) terminate the Contract, (b) require Buyer to provide adequate assurance of performance (including but not limited to payment), or (c) put in place special controls regarding Seller's Confidential Information.

18.4 If any provision of the Contract is found to be void or unenforceable, the remainder of the Contract shall not be affected. The parties will replace any such void or unenforceable provision with a new provision that achieves substantially the same practical or economic effect and is valid and enforceable.
18.5 The following Articles shall survive termination or cancellation of the Contract: 2, 3, 4, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17 and 18.
18.6 The Contract represents the entire agreement between the parties. No modification, amendment, rescission or waiver shall be binding on either party unless agreed in writing by the parties' authorized representatives.
18.7 This Contract may be executed in multiple counterparts that together shall constitute one agreement.
18.8 Except as provided in the Article entitled "Limitation of Liability," and in 18.1 above regarding nuclear use, this Contract is for the benefit of the parties and not for any third party.

Utility Manual

Subject: 5.0 Utility Location and Design - General

5.1 General Design Standards
5.2 Location Within the Right-of-Way
5.3 Clear Zone

Policy

1. **Standards Set by the Ministry.** The Ministry maintains a set of standards for utility installations in highway right-of-way with a particular focus on public safety, protection of Ministry staff and contractors, and protection of highway facilities. The Ministry's standards are not intended to replace standards set by regulators or accepted as good engineering practice.

2. **Highest Standards Apply.** Where the Ministry and a regulator both set a standard or requirement in a particular area, the highest or most stringent of the two will apply to any installation on highway right-of-way.

3. **Design Responsibility.** The utility is responsible for the design of any utility facility which it proposes to install in highway right-of-way and for the installation and maintenance of any facility once it has been installed. The Ministry's responsibility is limited to review and approval related to:

   - Consistency with Ministry policy;
   - Location within the right-of-way; and,
   - The method of installation or attachment.

4. **Durability.** All utility installations must be designed for long service life expectancy and must be relatively free from routine servicing and maintenance.

5. **Design for Expansion.** All new utility installations (or adjustments to existing lines) must make provision for known or planned expansion of those facilities, particularly where the facilities are attached to structures or are buried in the right-of-way.

Background to Policy

The general design requirements are based on a number of factors:

- The Ministry's interest in utilities is centred on public safety and preservation of highway facilities;
- The requirements which are set out in this manual are intended to

address these safety/highway preservation issues, and do *not* replace any standards which are set by regulators which have authority over the utility in question;

- The Ministry's interest does not alter the fact that the utility is responsible for safety and for conformance with applicable regulations; and,
- Requirements for durable design/materials and allowance for future expansion requirements are intended to minimize disruption caused by installation and repair of utility facilities.

Standards

For detailed requirements see the following sections of this manual:

Section:

8 Pipelines;
9 Water and Sewer Lines;
10 Overhead Power and Communication Lines;
11 Underground Power and Communication Lines; and,
13 Trenching, Boring and Jacking.

UTILITY MANUAL

Subject: 5.2 Location Within the Right-of-Way

Policy

1. **Minimum Need for Future Relocation.** Utilities must be located so as to minimize the need for later adjustment to accommodate future highway improvements and to permit servicing those facilities with minimum interference with highway traffic.

2. **Conformance with Locational Standards.** Utility installations must conform with location-related standards which are set out in this manual.

Background to Policy

Locational standards are set out in the following sections of the manual:

Section:

8 Pipelines;

9 Water and Sewer Lines;

10 Overhead Power and Communication Lines; and,

11 Underground Power and Communication Lines.

UTILITY MANUAL

Subject: 5.3 Clear Zone

Policy

1. **Conformance with Clear Zone Standards.** Above-ground installations must conform with the Clear Zone standards when:

   - New above-ground utilities are being installed;
   - An existing utility line is being rebuilt or replaced; and,
   - Utilities are being relocated as part of new highway construction or major upgrading of an existing highway.

2. **Other Remedies.** Other design measures may be acceptable in situations where Clear Zone standards cannot be achieved.

3. **The Clear Zone Does Not Over-ride Other Standards.** The Clear Zone standard is one of several standards related to the location of utilities within the highway right-of-way. Conformance with Clear Zone requirements does not eliminate the need to conform with other standards.

Background to Policy

Clear Zone standards are set out in Section B.1.1 of the Ministry's *Highway Design Manual*. Under that standard, a defined area beyond the pavement edge must be kept clear of all above-ground obstacles including poles, guy lines, and other above ground facilities.

Utilities may be permitted to install facilities within the Clear Zone if they are adequately protected by barriers or other measures. The following design options might be considered (the list is presented in descending order of preference and effectiveness):

1. *Remove the obstacle or redesign it so it can be safely traversed;*
2. *Relocate the obstacle to a point where it is less likely to be struck;*
3. *Reduce accident severity with an appropriate breakaway device; and,*
4. *Redirect the vehicle by shielding the obstacle with a traffic barrier and/or crash cushion.*

Source: *Highway Design Manual* Ministry of Transportation and Highways

Subject: 5.3 Clear Zone

On the recommendation of the Director, Highway Safety Branch, the District Highway Manager will make a determination of the appropriate design option based on local conditions including the accident history of the location of the proposed utility installation.

Clear Zone is one of several standards which affect the location of utilities within highway right-of-way. Each of those standards has a different purpose and effect. Consequently, they must all be accounted for as decisions are made. For example, compliance with Clear Zone standard does not eliminate the need to locate utilities within 2 metres of the edge of right-of-way wherever possible. Other locational standards appear in the following sections of this manual.

Section:

3.7 Scenic Enhancement
5.2 Location Within the Right-of-Way
8.2 Pipeline Location -- General
8.3 Pipeline Location -- Lines Along Right-of-Way
9.2 Water and Sewer Line Location -- General
9.3 Water and Sewer Line Location -- Lines Along Highway Right-of-Way
10.2 Pole Lines and Overhead Cable Location -- General
10.4 Pole Lines and Overhead Cable Location -- Lines Along Highway Right-of-way
11.2 Underground Power and Communication Line Location -- General
11.3 Underground Power and Communication Line Location -- Lines Along Highway Right-of-Way.

Procedure

Where utilities are being relocated as part of a new highway construction project or a major upgrading project, the Ministry's Project Designer or Project Manager is responsible for the application of Clear Zone standards.

The District Highways Manager is responsible for the application of Clear Zone standards in cases where: an existing utility installation is being rebuilt or replaced or a new utility facility is being installed on an existing highway. In the case of a pole line which is being rebuilt or replaced, the standards apply only where more than three adjacent poles are affected (i.e. more than three poles in a row).

Standards

New Installations on Open-Shoulder Highway

Clear Zone standards are set out in the Ministry's *Highway Design Manual*. Clear Zone setback requirements depend on a

Subject: 5.3 Clear Zone

number of factors including: class of highway; design speed; whether the facility is being installed on a cut or fill section; and the steepness and height of the cut or fill slope. The following table provides an indication of the set-backs required to conform with clear zone standards for fill sections on rural highways. It is important to recognize that *Clear Zone requirements for a particular case depends on highway design details*.

All pole lines, guy wires and other structures must be located outside the clear zone width which is set out in this chapter.

Clear Zone Set-back Requirements on Fill Sections

Design Speed (km/h)	MINIMUM CLEAR ZONE WIDTH (m)						
	Design Classification						
km/h	RLU	RCU	RCD	RAU	RAD	RED	RFD
50	3.5	4.0	-	-	-	-	-
60	3.5	4.0	4.5	-	-	-	-
70	4.5	5.5	6.0	6.0	6.5	-	-
80	4.5	6.0	6.5	6.5	7.0	7.0	-
90	-	7.0	7.5	7.5	8.0	8.0	8.0
100	-	8.0	8.5	8.5	9.0	9.0	10.0
110	-	-	-	-	-	9.0	10.0

Source: Table B.1.1a, *Highway Engineering Design Manual*, Ministry of Transportation and Highways.

Road Class

RLU Rural Local Undivided
RCU Rural Collector Undivided
RCD Rural Collector Divided
RAU Rural Arterial Undivided
RAD Rural Arterial Divided
RED Rural Expressway Divided
RFD Rural Freeway Divided

NOTE: The Clear Zone width does not apply to Subdivision Roads or Low Volume Roads. However, an obstacle free area, or utility setback adjacent to Subdivision Roads and Low Volume Roads which is 2 metres from the toe of the slope is required.

New Installations on Curb and Gutter Sections

Where the posted speed on curb and gutter sections is 60 km/h or less, poles, guy wires, and other structures must be located at least 0.5 m behind the sidewalk (if there is one) or a minimum of 2.0 m from the outside face of the curb, whichever is greater.

Where the posted speed exceeds 60 km/h, pole lines, guy wires and other structures must be located outside the clear zone distance which is set out in this Section, or be protected by an approved guardrail.

Exceptions to Offset Requirements for New Installations

An exception to new-installation offset requirements can be made in the following circumstances:

- Where poles or other facilities are being replaced as part of a routine maintenance program for a facility which is covered by a valid permit, the offset requirement for existing facilities can be used. In the case of a pole line, no more than three poles in row are being replaced. *Multiple permits cannot be used to avoid relocation where more than three poles are being replaced;*
- Offset requirements do not apply when above-ground facilities can be placed behind existing guardrails, retaining walls, and other similar protected area; and,
- Offset requirements do not apply when an approved guardrail or other suitable and approved protection is installed by the applicant.

References

Highway Engineering Design Manual, Ministry of Transportation and Highways.

Subject: 5.3 Clear Zone

New Standards
Clear Zones for Highway Rehabilitation Projects

Clear Zone standards for highway rehabilitation projects are being developed at the present time. Proposed standards will be circulated in September 1994 as a Discussion Paper. Highway Engineering Branch is responsible for developing this policy in conjunction with the Highway Safety Branch.

Chernikhowsky, Paul

From: Klashinsky, Curtis
Sent: June-28-10 10:16 AM
To: Pataki, Ferenc (Terasen Gas)
Cc: Chernikhowsky, Paul
Subject: FW: Terasen Gas Response to BCUC CPCN Guidelines

Categories: CC

Hello Ferenc. My name is Curtis Klashinsky, Manager, Engineering for FortisBC. I am leading the FortisBC efforts on estimating and would be pleased to attend your meeting on July 14.

Curtis Klashinsky
T:250-368-0310
C:250-368-1917

From: Chernikhowsky, Paul
Sent: Friday, June 25, 2010 9:30 AM
To: Klashinsky, Curtis; Ward, Martin
Subject: FW: Terasen Gas Response to BCUC CPCN Guidelines

Paul M. Chernikhowsky, P.Eng.
Director of Engineering Services
FORTISBC
2076 Enterprise Way - Suite 200
Kelowna, BC V1Y 6H7
Phone: 250-717-0894
Fax: 866-461-0987
Cell: 250-215-4809
paul.chernikhowsky@fortisbc.com

From: Sam, Doyle
Sent: June 25, 2010 7:49 AM
To: Chernikhowsky, Paul
Subject: FW: Terasen Gas Response to BCUC CPCN Guidelines

From: Pataki, Ferenc [mailto:Ferenc.Pataki@terasengas.com]
Sent: Thursday, June 24, 2010 5:35 PM
To: Sam, Doyle
Subject: Terasen Gas Response to BCUC CPCN Guidelines

Doyle

The BCUC has recently published a new set of guidelines with the following requirements;

A comparison of the costs, benefits and associated risks of the project and feasible alternatives,

including estimates of the value of all of the costs and benefits of each option or, where these costs and benefits are not quantifiable, identification of the cost or benefit that cannot be quantified. Cost estimates used in the economic comparison should have, at a minimum, a Class 41 degree of accuracy as defined in the Advancement of Cost Engineering ("AACE International") Recommended Practice No. 10S-90, Cost Engineering Terminology (May 20, 2009);

I am the Chair of a committee that is working to developing a cost estimating framework that is aligned with AACE and on that will allow us to meet the above requirement. The committee has met a number of times during the last month or so and we will be meeting with a representative from Worley Parsons on July 14 (1 – 4 pm) to better understand;

1) The AACE guideline requirements
2) The Worley Parsons framework
3) What we may need to do for Terasen Gas.

I do not know what actions FortisBC is taking to respond to the above requirement and given that we are under common leadership, I wanted to know how we could align and combine our efforts on this. As such, perhaps there is someone at FortisBC who should participate on our committee and attend the July 14 meeting.

I would appreciate knowing what FortisBC is doing on this matter and how could come together in some manner to share our approaches to this matter.

Thanks

http://www.bcuc.com/Documents/Guidelines/2010/DOC_25326_G-50-10_2010-CPCN-Application-Guidelines.pdf

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The Company believes that this methodology has good potential to improve future forecasting efforts, and should be further enhanced and developed to obtain increasingly better results and planning insight. Some areas of enhancement that may be undertaken in the future include:

- Expanding forecasting area to the entire FortisBC region;
- More detailed feeder and substation regression trending to guide the model;
- Determining better growth rates on a per customer class basis; and
- Expanding on the land use classifications.

2.2 Project Estimation Methodology

In preparing the estimates for the plan, concepts developed by the Association for the Advancement of Cost Engineering (AACE) were introduced. FortisBC referenced a number of documents in developing improved internal estimating practices, including the:

- AACE International Recommended Practice No. 10S-90, "Cost Engineering Terminology";
- AACE International Recommended Practice No. 17R-97 "Cost Estimate Classification System"; and
- AACE International Recommended Practice No. 18R-97 "Cost Estimate Classification System - As Applied in Engineering, Procurement, and Construction for the Process Industries".

The AACE 18R-97 document is specifically structured for process industries including firms involved with the manufacturing and production of chemicals, petrochemicals, and hydrocarbon processing. However, the guidelines are generally applicable to other industries, which could include regulated utilities. Specific guidelines addressing other industries (such as utilities) may be developed by AACE over time.

In Order G-50-10 and its associated document entitled "2010 Certificates of Public Convenience and Necessity - Application Guidelines", the Commission has already required the use of the AACE estimating classifications in the development of Certificate of Public Convenience and Necessity (CPCN) cost estimates. For example, Class 4 level estimates are required for CPCN project option analysis estimates and Class 3 level estimates are required for the recommended project solution.

FortisBC has extended this concept beyond CPCN applications and has employed the AACE concepts during the scoping and estimating of the projects in the 2012 System Development Plan. In reviewing and evaluating the AACE guidelines, the company developed the following structured approach to cost estimating as it relates to the guideline.

Table 2.2 - AACE Classifications

AACE Classification	Project Stage	Description	FortisBC Typical Project Plan Windows
Class 5	Identify	Determine project feasibility and alignment with business strategy.	5 to 20 year plan window
Class 4	Evaluate	Select the preferred Development Option(s) and Execution Strategy.	3 to 5 year plan window
Class 3	Define	Finalize project scope, cost and schedule and Sanction Project. Prepare for Execute Phase.	1 to 2 year plan window (Capital Plan approval window)
Class 2	Execute	Safely Produce an operating asset consistent with scope, cost and schedule.	Tracking execution
Class 1	Operate (or Audit level)	Evaluate and Operate asset to ensure performance to specifications and maximum return to the Client.	Quality Control or Close Out

It should be noted however that the AACE classification approach is still under development; therefore, not all capital projects can be categorized as the above table suggests. For example, sustainment programs such as the Transmission/Distribution Rehabilitation programs do not have sufficient information available at the time the plan is prepared to develop full Class 3 accuracy estimates and supporting documentation.

As well, the AACE classifications and guidelines were generally intended for private industry. As a regulated utility with an obligation to serve safely and reliably, FortisBC does not necessarily have the same freedom of scope and cost control in its projects.

All project cost estimates were developed in 2010 dollars and include an annualized, constant 2 percent inflation rate based on the Consumer Price Index (CPI).

2.2.1 ACCOUNTING PRACTICES

FortisBC's Capitalization Policy guidelines currently conform to *Pre-Changeover Canadian Generally Accepted Accounting Principles* (CGAAP) and US Generally Acceptable Accounting Principles (US GAAP). Pre-changeover CGAAP is the basis for the preparation

Transmission and Distribution Estimating Guidelines

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2. ESTIMATE CLASSES

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APPENDIX C - STATION 'CHECKLIST'
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1. Estimating Requirements

On March 18, 2010, the BCUC published 2010 Certificates of Public Convenience and Necessity Application Guidelines G-50-10 (Appendix G). The document outlines the estimating guidelines/methodology that will be required for CPCN applications. The estimating methodology referenced is based on AACE Guidelines (Appendix B). In addition to adopting this methodology for its CPCN applications, FortisBC is adopting this methodology, in concept, for its capital expenditure plan submissions.

Different cost estimate classifications of projects are used at specific project stages to evaluate, approve, *and/or* fund projects. This document is intended to provide guidelines for applying the principles of estimate classification, specifically on project estimates for engineering, procurement and construction management for projects to be submitted in the Capital Expenditure Plan. The core of a capital project is the physical plant and its various components and elements. The better these elements and components are defined, the more accurate the resulting engineering, procurement, and construction cost estimate and schedule will be. Increasing the level of project definition is accomplished by performing the engineering work from the Identify stage through to the Operate stage (see Table 1). The class of estimate available is therefore related to, and dependent upon, the amount of planning and front end engineering design (FEED) work completed and the level of project/technical definition expressed as a percentage of complete project definition. The stages of Identify, Evaluate, Define, and Execute provide increased levels of information available for developing estimates of capital cost and project schedule. As the project passes through to the next stage, there should be an improved understanding of the project and a corresponding reduction in cost and schedule uncertainty.

Table 1:

AACE Classification	Project Stage	Description	FortisBC Usage
Class 5	Identify	Determine project feasibility and alignment with business strategy.	5 to 20 year plan window
Class 4	Evaluate	Select the preferred Development Option(s) & Execution Strategy.	3 to 5 year plan window
Class 3	Define	Finalize project scope, cost and schedule and Sanction Project. Prepare for Execute Phase.	1 to 2 year plan window (CEP approval window)
Class 2	Execute	Safely Produce an operating asset consistent with scope, cost & schedule.	Tracking execution
Class 1	Operate (or Audit level)	Evaluate & Operate asset to ensure performance to specifications and maximum return to the Client.	Quality Control or Close Out

The aim of these guidelines is to provide common terminology and a consistent methodology for developing, understanding and using cost estimates and schedules across the list of FortisBC generation, transmission, station, and distribution projects.

These estimate classifications, categorized relative to the degree of project/technical definition completed, are summarized in Table 2. These classifications are intended to convey the state of design development upon which an estimate is based, the probable range of variation of the estimated cost and the purpose for which each estimate class maybe used.

Estimates are a key input to the decision making process and their accuracy needs to be defined to quantify the reliability and variability of the information on which the decision is to be based. Estimates should therefore be a realistic attempt to define the extent of a project both in scope and cost. It should be noted that the information supporting an estimate often relies on an extensive list of assumptions around constructability in particular. These assumptions are progressively refined as engineering progresses, but need to be identified and addressed at all stages.

Table 2:

Classification	Expected Accuracy Range		Purpose	Project/Technical Definition	Estimating Methodology	FBC End Usage
	Low	High				
Class 5 'Identify Phase'	-20 to -50%	+30 to +100%	• Long range capital funding levels • Market studies • Preliminary Assessments • Conceptual evaluation of alternative schemes • Preliminary project/concept screening	• 0 to 2% • Conceptual level engineering • Route/locations identified through maps • Affected external stakeholders identified • System parameters identified	• 'Rule of Thumb' costing • Historical data • Judgment based	5 to 20 year plan window
Class 4 'Evaluate Phase'	-15 to -30%	+20 to +50%	• Detailed strategic planning • Business case assessment • Project screening at a more developed stage • Confirmation of economic and/or technical feasibility • Evaluation of alternative schemes	• 1 to 15% • Pre-FEED[1] to FEED[1] level engineering • Route/locations researched through land checks • Affected external stakeholders identified and risk assessed • System parameters defined • System limitations defined • Preliminary operational contingency plans identified • Equipment parameters identified • Major material list compiled • Project schedule at concept level	• Preliminary estimate with risk conceptualized • Historical data • Gross unit costs • Budgetary equipment and material quotes • Develop construction labour and equipment crew costs	3 to 5 year plan window

Classification	Expected Accuracy Range		Purpose	Project/Technical Definition	Estimating Methodology	FBC End Usage
Class 3 'Define Phase'	-10 to -20%	+10 to +30%	• Project Funding authorization • First control estimate or project budget • Approval to proceed to next stage or control gate	• 25 to 40% • FEED[1]-level engineering • Prepare Design Basis Memorandum • Final route/locations defined and researched • Operational contingency plans developed • Non standard equipment specifications • Material list • Project schedule at task level • Project Execution Plan	• Budget estimate with risk identified • Budgetary equipment and material pricing • Develop construction labour and equipment crew cost and incorporate in cost estimate • Budgetary pricing on work components (if required)	Capital Plan filing timeframe (1 to 2 year plan window)
Class 2 'Execute Phase'	-5 to -15%	+5 to +20%	• Detailed control estimate	• 50 to 70% • Detailed level engineering • Issue construction packages • Issue RFQs for equipment, materials, and bid documents for construction packages	• Control estimate • Equipment and material RFQs • Update construction, labour and equipment crew costs	Tracking execution
Class 1 'Operate Phase' or 'Close-Out Phase'	-3 to -10%	+3 to +15%	• Final control estimate • Used to track actual costs against the final control estimate • Used to monitor variations • Used to validate claims and disputes	• 75 to1 00% • Completed Engineering • Updated data from contractors and equipment and material vendors	• Control estimate • Use contractor and equipment and material vendors' actual costs	Quality control or close out

Notes: (1) FEED – Front End Engineering Design

The Guidelines, in addition to providing the classification criteria outlined in Table 1 and Table 2, consist of a series of checklists for each asset group which can be used to confirm documentation compliance with a given estimate class (Appendices C to F). The purpose of the checklists is to provide directions so that the employees with different levels of experience can create the documentation and produce an estimate to support the proper class and arrive at similar results. There is one sheet for each estimate class within each asset group. Each sheet has the requirements that are asset group specific. “Risk premium”, contingency and other allowances need to be specifically addressed.

To aid in following the checklists, an “interpretation guide” has been developed for each checkbox to explain in more detail what it means (i.e. does “Site survey reviewed/considered” mean a current survey was commissioned, or is a paper tracing from 50 years ago being used?).

Historically, estimates were an educated guess based on past expenditures and experience with the work being done. Uncertainty was factored in through contingency or adjusting the values of a particular task. Looking forward, as it is difficult to identify and factor in all possible scenarios, we will be taking an approach by which we will determine the cost of the work with a risk factor to determine the potential high end of the work. All projects are to have an estimate which would contain the base estimate and contingency. In addition a risk factor (usually defined in dollars) is to be identified based on the specifics of the project.

<u>Example</u>

Project: PLN11-1066
Project Name: Ellison to Sexsmith Transmission tie
Estimate Level: 3
Estimate: $4,500,000 (includes contingency of $350,000)
Risk: $500,000 (potential 8 month delay in permitting and public consultation)

Therefore, the request for budgetary approval for this project would include $4,500,000 with the understanding that there is a potential risk of an additional $500,000 if the risks identified are realized.

2. Estimate Classes

Class 5

Class 5 estimates are ballpark and built on ‘rule of thumb’ costing and rudimentary (or limited) information. The level of effort required to prepare the estimate would depend on the scope of the project as well as the estimating cost data and tools available. It has fundamental definition of scope with typically only Planning and Engineering ‘signoffs’. These are projects that are typically beyond a 5 year horizon.

Class 4

Class 4 estimates are for evaluation purposes and are built on ‘rule of thumb’ costing adjusted to the project specifics at a group task level and involves ‘budgetary pricing’ from vendors on specific materials/work. It requires rudimentary (or limited) information with increased effort on definition of parameters and stakeholder input. The level of effort required to prepare the estimate would depend on the scope of the project as well as the estimating cost data and tools available. It has preliminary definition of scope with typically Planning, Engineering and Operations ‘signoffs’. These are projects that are typically in a 3 to 5 year horizon.

Class 3

Class 3 estimates are for budgetary approval and are built on detailed tasks and costs associated with those tasks. It involves specific prices based either in recent purchases/expenditures or quotations. It requires detailed information and clear definition of parameters and stakeholder input. The level of effort required to prepare the estimate would depend on the scope of the project as well as the estimating cost data and tools available. It has detailed definition of scope with typically Planning, Engineering, Operations and Project Management ‘signoffs’. These are projects that are in a budget approval year(s) or cycle.

This level does imply that all material quotes and tenders are ‘ready to go’ and would be executed once approval is given. Although this works an industry where approval to spend lies entirely with the owner, it does not work entirely in the regulated utility environment where approvals are from an external body and

can take several years from project estimate/definition to approval of funds. Therefore we need to look at a hybrid of level 3 estimate with confidence level utilizing standard material, recent purchases/experience and budgetary quotations/pricing. This does not provide the same financial level of confidence as in the private sector. However, it does provide a level of confidence given similar circumstances.

Class 2

This is part of the project management philosophies/process and is not discussed within this document.

Class 1

This is part of the project management philosophies/process and is not discussed within this document.

APPENDIX A - Terms

Cost Estimate

A prediction of quantities, cost, and/or price of resources required by the scope of an asset investment option, activity, or project. As a prediction, an estimate must address risks and uncertainties. Estimates are used primarily as inputs for budgeting, cost or value analysis, decision making in business, asset and project planning, or for project cost and schedule control processes. Cost estimates are determined using experience and calculating and forecasting the future cost of resources, methods, and management within a scheduled time frame.

Escalation

The provision in actual or estimated costs for an increase in the cost of equipment, material, labor, etc., over that specified in the purchase order or contract due to continuing price level changes over time. Inflation may be a component of escalation, but non-monetary policy influences, such as supply-and-demand, are often components.

Contingency (AACE)

AACE International, the Association for the Advancement of Cost engineering, has defined contingency as "An amount added to an estimate to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows will likely result, in aggregate, in additional costs. Typically estimated using statistical analysis or judgment based on past asset or project experience. Contingency usually excludes:

1. Major scope changes such as changes in end product specification, capacities, building sizes, and location of the asset or project;
2. Extraordinary events such as major strikes and natural disasters;
3. Management reserves; and
4. Escalation and currency effects.

Some of the items, conditions, or events for which the state, occurrence, and/or effect is uncertain include, but are not limited to, planning and estimating errors and omissions, minor price fluctuations other than general escalation), design developments and changes within the scope, and variations in market and environmental conditions. Contingency is generally included in most estimates, and **is expected to be expended**".

Project

Based on commonly used Project Management terminology, Project's definition is as follow: *"A temporary endeavor with a specific objective to be met within the*

prescribed time and monetary limitations and which has been assigned for definition or Project Cost Estimating Guidelines Procedure #CRC-001 Rev. 2 **April, 27th 2009 Page 5 | 20** *execution" (AACE / PMI).* Regional Transmission projects are typically defined by the transmission owner as a result of the solution study. Projects are broken down by components in the RSP listing (Lines & Substations) but are typically permitted and reviewed as a whole for efficiency and resource/costs savings.

Project Scope

The sum of all that is to be or has been invested in and delivered by the performance of an activity or project. In project planning, the scope is usually documented (i.e., the scope document).

Change in Scope

A change in the defined deliverables or resources used to provide them.

Level of Project Definition

This characteristic is based upon percent complete of project definition (roughly corresponding to percent complete of engineering). The level of project definition defines maturity or the extent and types of input information available to the estimating process. Such inputs include project scope definition, requirements documents, specifications, project plans, drawings, calculations, learnings from past projects, reconnaissance data, and other information that must be developed to define the project.

Risk Sources

Events or conditions that have been defined for use in Risk Assessment that might affect the outcome of a project. Risk sources are frequently subdivided into the following groups, based on the underlying source of the source: 1) Business needs risks; 2) Results definition risks; 3) Scope definition risks; 4) Execution plan, mastery and processes risks; and 5) External risks.

Risk Types

A means of characterizing risk for use in risk assessment by the type of risk:

1. Inherited -derived from preceding stages of project;
2. Economic - associated with availability and costs of resources;
3. Commercial - associated with customer's needs and wants, competition, etc.;

4. Technological - associated with ability to achieve desired results, produce products, etc. life of current or new technology and compatibility of new technologies;
5. Implementation - ability to meet project plan and commitments due to human behavior or organizational factors.

APPENDIX B - AACE Guidelines

AACE International Recommended Practice No. 18R-97

COST ESTIMATE CLASSIFICATION SYSTEM – AS APPLIED IN ENGINEERING, PROCUREMENT, AND CONSTRUCTION FOR THE PROCESS INDUSTRIES

TCM Framework: 7.3 – Cost Estimating and Budgeting

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COST ESTIMATE CLASSIFICATION SYSTEM – AS APPLIED IN ENGINEERING, PROCUREMENT, AND CONSTRUCTION FOR THE PROCESS INDUSTRIES

TCM Framework: 7.3 – Cost Estimating and Budgeting

February 2, 2005

PURPOSE

As a recommended practice of AACE International, the Cost Estimate Classification System provides guidelines for applying the general principles of estimate classification to project cost estimates (i.e., cost estimates that are used to evaluate, approve, and/or fund projects). The Cost Estimate Classification System maps the phases and stages of project cost estimating together with a generic maturity and quality matrix, which can be applied across a wide variety of industries.

This addendum to the generic recommended practice provides guidelines for applying the principles of estimate classification specifically to project estimates for engineering, procurement, and construction (EPC) work for the process industries. This addendum supplements the generic recommended practice (17R-97) by providing:

- a section that further defines classification concepts as they apply to the process industries;
- charts that compare existing estimate classification practices in the process industry; and
- a chart that maps the extent and maturity of estimate input information (project definition deliverables) against the class of estimate.

As with the generic standard, an intent of this addendum is to improve communications among all of the stakeholders involved with preparing, evaluating, and using project cost estimates specifically for the process industries.

It is understood that each enterprise may have its own project and estimating processes and terminology, and may classify estimates in particular ways. This guideline provides a generic and generally acceptable classification system for process industries that can be used as a basis to compare against. It is hoped that this addendum will allow each user to better assess, define, and communicate their own processes and standards in the light of generally-accepted cost engineering practice.

INTRODUCTION

For the purposes of this addendum, the term process industries is assumed to include firms involved with the manufacturing and production of chemicals, petrochemicals, and hydrocarbon processing. The common thread among these industries (for the purpose of estimate classification) is their reliance on process flow diagrams (PFDs) and piping and instrument diagrams (P&IDs) as primary scope defining documents. These documents are key deliverables in determining the level of project definition, and thus the extent and maturity of estimate input information.

Estimates for process facilities center on mechanical and chemical process equipment, and they have significant amounts of piping, instrumentation, and process controls involved. As such, this addendum may apply to portions of other industries, such as pharmaceutical, utility, metallurgical, converting, and similar industries. Specific addendums addressing these industries may be developed over time.

This addendum specifically does not address cost estimate classification in nonprocess industries such as commercial building construction, environmental remediation, transportation infrastructure, “dry” processes such as assembly and manufacturing, “soft asset” production such as software development, and similar industries. It also does not specifically address estimates for the exploration, production, or transportation of mining or hydrocarbon materials, although it may apply to some of the intermediate processing steps in these systems.

The cost estimates covered by this addendum are for engineering, procurement, and construction (EPC) work only. It does not cover estimates for the products manufactured by the process facilities, or for research and development work in support of the process industries. This guideline does not cover the

significant building construction that may be a part of process plants. Building construction will be covered in a separate addendum.

This guideline reflects generally-accepted cost engineering practices. This addendum was based upon the practices of a wide range of companies in the process industries from around the world, as well as published references and standards. Company and public standards were solicited and reviewed by the AACE International Cost Estimating Committee. The practices were found to have significant commonalities that are conveyed in this addendum.

COST ESTIMATE CLASSIFICATION MATRIX FOR THE PROCESS INDUSTRIES

The five estimate classes are presented in figure 1 in relationship to the identified characteristics. Only the level of project definition determines the estimate class. The other four characteristics are secondary characteristics that are generally correlated with the level of project definition, as discussed in the generic standard. The characteristics are typical for the process industries but may vary from application to application.

This matrix and guideline provide an estimate classification system that is specific to the process industries. Refer to the generic standard for a general matrix that is non-industry specific, or to other addendums for guidelines that will provide more detailed information for application in other specific industries. These will typically provide additional information, such as input deliverable checklists to allow meaningful categorization in those particular industries.

	Primary Characteristic	***Secondary Characteristic***			
ESTIMATE CLASS	**LEVEL OF PROJECT DEFINITION** Expressed as % of complete definition	**END USAGE** Typical purpose of estimate	**METHODOLOGY** Typical estimating method	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges [a]	**PREPARATION EFFORT** Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
Class 3	10% to 40%	Budget, Authorization, or Control	Semi-Detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10
Class 2	30% to 70%	Control or Bid/ Tender	Detailed Unit Cost with Forced Detailed Take-Off	L: -5% to -15% H: +5% to +20%	4 to 20
Class 1	50% to 100%	Check Estimate or Bid/Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

Notes: [a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.

[b] If the range index value of "1" represents 0.005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

Figure 1. – Cost Estimate Classification Matrix for Process Industries

CHARACTERISTICS OF THE ESTIMATE CLASSES

The following charts (figures 2a through 2e) provide detailed descriptions of the five estimate classifications as applied in the process industries. They are presented in the order of least-defined estimates to the most-defined estimates. These descriptions include brief discussions of each of the estimate characteristics that define an estimate class.

For each chart, the following information is provided:

- **Description:** a short description of the class of estimate, including a brief listing of the expected estimate inputs based on the level of project definition.
- **Level of Project Definition Required:** expressed as a percent of full definition. For the process industries, this correlates with the percent of engineering and design complete.
- **End Usage:** a short discussion of the possible end usage of this class of estimate.
- **Estimating Methods Used:** a listing of the possible estimating methods that may be employed to develop an estimate of this class.
- **Expected Accuracy Range:** typical variation in low and high ranges after the application of contingency (determined at a 50% level of confidence). Typically, this results in a 90% confidence that the actual cost will fall within the bounds of the low and high ranges.
- **Effort to Prepare:** this section provides a typical level of effort (in hours) to produce a complete estimate for a US$20,000,000 plant. Estimate preparation effort is highly dependent on project size, project complexity, estimator skills and knowledge, and on the availability of appropriate estimating cost data and tools.
- **ANSI Standard Reference (1989) Name:** this is a reference to the equivalent estimate class in the existing ANSI standards.
- **Alternate Estimate Names, Terms, Expressions, Synonyms:** this section provides other commonly used names that an estimate of this class might be known by. These alternate names are not endorsed by this Recommended Practice. The user is cautioned that an alternative name may not always be correlated with the class of estimate as identified in the chart.

CLASS 5 ESTIMATE	
Description: Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systemic manner. Class 5 estimates, due to the requirements of end use, may be prepared within a very limited amount of time and with little effort expended—sometimes requiring less than an hour to prepare. Often, little more than proposed plant type, location, and capacity are known at the time of estimate preparation. **Level of Project Definition Required:** 0% to 2% of full project definition. **End Usage:** Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.	**Estimating Methods Used:** Class 5 estimates virtually always use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. **Expected Accuracy Range:** Typical accuracy ranges for Class 5 estimates are - 20% to -50% on the low side, and +30% to +100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. **Effort to Prepare (for US$20MM project):** As little as 1 hour or less to perhaps more than 200 hours, depending on the project and the estimating methodology used. **ANSI Standard Reference Z94.2-1989 Name:** Order of magnitude estimate (typically -30% to +50%). **Alternate Estimate Names, Terms, Expressions, Synonyms:** Ratio, ballpark, blue sky, seat-of-pants, ROM, idea study, prospect estimate, concession license estimate, guesstimate, rule-of-thumb.

Figure 2a. – Class 5 Estimate

CLASS 4 ESTIMATE	
Description: Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 15% complete, and would comprise at a minimum the following: plant capacity, block schematics, indicated layout, process flow diagrams (PFDs) for main process systems, and preliminary engineered process and utility equipment lists. **Level of Project Definition Required:** 1% to 15% of full project definition. **End Usage:** Class 4 estimates are prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage.	**Estimating Methods Used:** Class 4 estimates virtually always use stochastic estimating methods such as equipment factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, the Miller method, gross unit costs/ratios, and other parametric and modeling techniques. **Expected Accuracy Range:** Typical accuracy ranges for Class 4 estimates are -15% to -30% on the low side, and +20% to +50% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. **Effort to Prepare (for US$20MM project):** Typically, as little as 20 hours or less to perhaps more than 300 hours, depending on the project and the estimating methodology used. **ANSI Standard Reference Z94.2-1989 Name:** Budget estimate (typically -15% to + 30%). **Alternate Estimate Names, Terms, Expressions, Synonyms:** Screening, top-down, feasibility, authorization, factored, pre-design, pre-study.

Figure 2b. – Class 4 Estimate

CLASS 3 ESTIMATE	
Description: Class 3 estimates are generally prepared to form the basis for budget authorization, appropriation, and/or funding. As such, they typically form the initial control estimate against which all actual costs and resources will be monitored. Typically, engineering is from 10% to 40% complete, and would comprise at a minimum the following: process flow diagrams, utility flow diagrams, preliminary piping and instrument diagrams, plot plan, developed layout drawings, and essentially complete engineered process and utility equipment lists. **Level of Project Definition Required:** 10% to 40% of full project definition. **End Usage:** Class 3 estimates are typically prepared to support full project funding requests, and become the first of the project phase "control estimates" against which all actual costs and resources will be monitored for variations to the budget. They are used as the project budget until replaced by more detailed estimates. In many owner organizations, a Class 3 estimate may be the last estimate required and could well form the only basis for cost/schedule control.	**Estimating Methods Used:** Class 3 estimates usually involve more deterministic estimating methods than stochastic methods. They usually involve a high degree of unit cost line items, although these may be at an assembly level of detail rather than individual components. Factoring and other stochastic methods may be used to estimate less-significant areas of the project. **Expected Accuracy Range:** Typical accuracy ranges for Class 3 estimates are -10% to -20% on the low side, and +10% to +30% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. **Effort to Prepare (for US$20MM project):** Typically, as little as 150 hours or less to perhaps more than 1,500 hours, depending on the project and the estimating methodology used. **ANSI Standard Reference Z94.2-1989 Name:** Budget estimate (typically -15% to + 30%). **Alternate Estimate Names, Terms, Expressions, Synonyms:** Budget, scope, sanction, semi-detailed, authorization, preliminary control, concept study, development, basic engineering phase estimate, target estimate.

Figure 2c. – Class 3 Estimate

CLASS 2 ESTIMATE	
Description: Class 2 estimates are generally prepared to form a detailed control baseline against which all project work is monitored in terms of cost and progress control. For contractors, this class of estimate is often used as the "bid" estimate to establish contract value. Typically, engineering is from 30% to 70% complete, and would comprise at a minimum the following: process flow diagrams, utility flow diagrams, piping and instrument diagrams, heat and material balances, final plot plan, final layout drawings, complete engineered process and utility equipment lists, single line diagrams for electrical, electrical equipment and motor schedules, vendor quotations, detailed project execution plans, resourcing and work force plans, etc. **Level of Project Definition Required:** 30% to 70% of full project definition. **End Usage:** Class 2 estimates are typically prepared as the detailed control baseline against which all actual costs and resources will now be monitored for variations to the budget, and form a part of the change/variation control program.	**Estimating Methods Used:** Class 2 estimates always involve a high degree of deterministic estimating methods. Class 2 estimates are prepared in great detail, and often involve tens of thousands of unit cost line items. For those areas of the project still undefined, an assumed level of detail takeoff (forced detail) may be developed to use as line items in the estimate instead of relying on factoring methods. **Expected Accuracy Range:** Typical accuracy ranges for Class 2 estimates are -5% to -15% on the low side, and +5% to +20% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. **Effort to Prepare (for US$20MM project):** Typically, as little as 300 hours or less to perhaps more than 3,000 hours, depending on the project and the estimating methodology used. Bid estimates typically require more effort than estimates used for funding or control purposes. **ANSI Standard Reference Z94.2-1989 Name:** Definitive estimate (typically -5% to + 15%). **Alternate Estimate Names, Terms, Expressions, Synonyms:** Detailed control, forced detail, execution phase, master control, engineering, bid, tender, change order estimate.

Figure 2d. – Class 2 Estimate

CLASS 1 ESTIMATE	
Description: Class 1 estimates are generally prepared for discrete parts or sections of the total project rather than generating this level of detail for the entire project. The parts of the project estimated at this level of detail will typically be used by subcontractors for bids, or by owners for check estimates. The updated estimate is often referred to as the current control estimate and becomes the new baseline for cost/schedule control of the project. Class 1 estimates may be prepared for parts of the project to comprise a fair price estimate or bid check estimate to compare against a contractor's bid estimate, or to evaluate/dispute claims. Typically, engineering is from 50% to 100% complete, and would comprise virtually all engineering and design documentation of the project, and complete project execution and commissioning plans. **Level of Project Definition Required:** 50% to 100% of full project definition. **End Usage:** Class 1 estimates are typically prepared to form a current control estimate to be used as the final control baseline against which all actual costs and resources will now be monitored for variations to the budget, and form a part of the change/variation control program. They may be used to evaluate bid checking, to support vendor/contractor negotiations, or for claim evaluations and dispute resolution.	**Estimating Methods Used:** Class 1 estimates involve the highest degree of deterministic estimating methods, and require a great amount of effort. Class 1 estimates are prepared in great detail, and thus are usually performed on only the most important or critical areas of the project. All items in the estimate are usually unit cost line items based on actual design quantities. **Expected Accuracy Range:** Typical accuracy ranges for Class 1 estimates are -3% to -10% on the low side, and +3% to +15% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. **Effort to Prepare (for US$20MM project):** Class 1 estimates require the most effort to create, and as such are generally developed for only selected areas of the project, or for bidding purposes. A complete Class 1 estimate may involve as little as 600 hours or less, to perhaps more than 6,000 hours, depending on the project and the estimating methodology used. Bid estimates typically require more effort than estimates used for funding or control purposes. **ANSI Standard Reference Z94.2 Name:** Definitive estimate (typically -5% to + 15%). **Alternate Estimate Names, Terms, Expressions, Synonyms:** Full detail, release, fall-out, tender, firm price, bottoms-up, final, detailed control, forced detail, execution phase, master control, fair price, definitive, change order estimate.

Figure 2e. – Class 1 Estimate

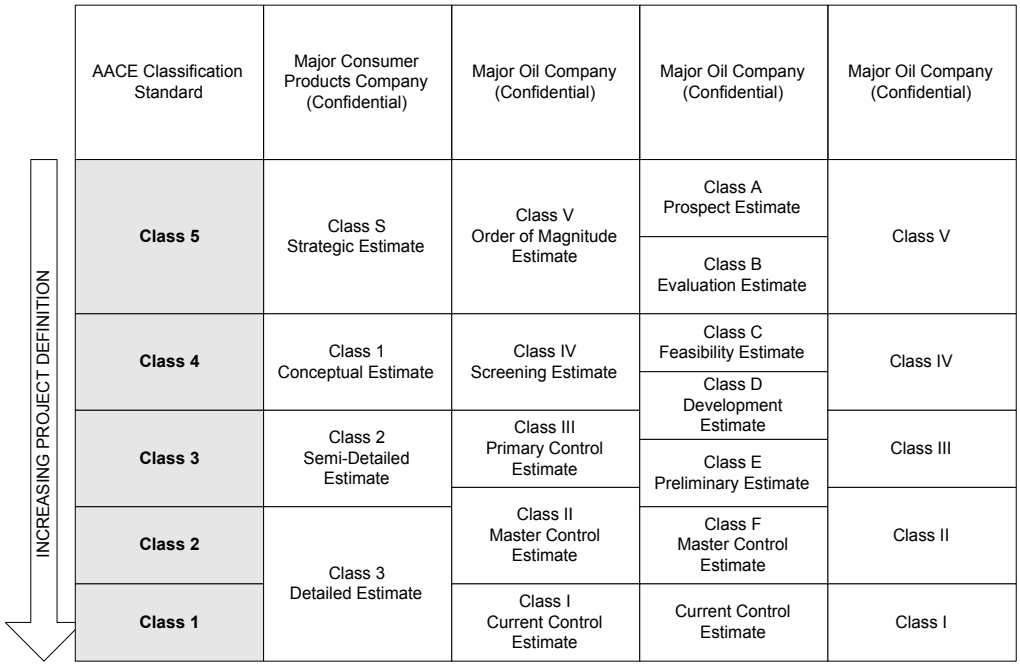
COMPARISON OF CLASSIFICATION PRACTICES

Figures 3a through 3c provide a comparison of the estimate classification practices of various firms, organizations, and published sources against one another and against the guideline classifications. These tables permits users to benchmark their own classification practices.

INCREASING PROJECT DEFINITION

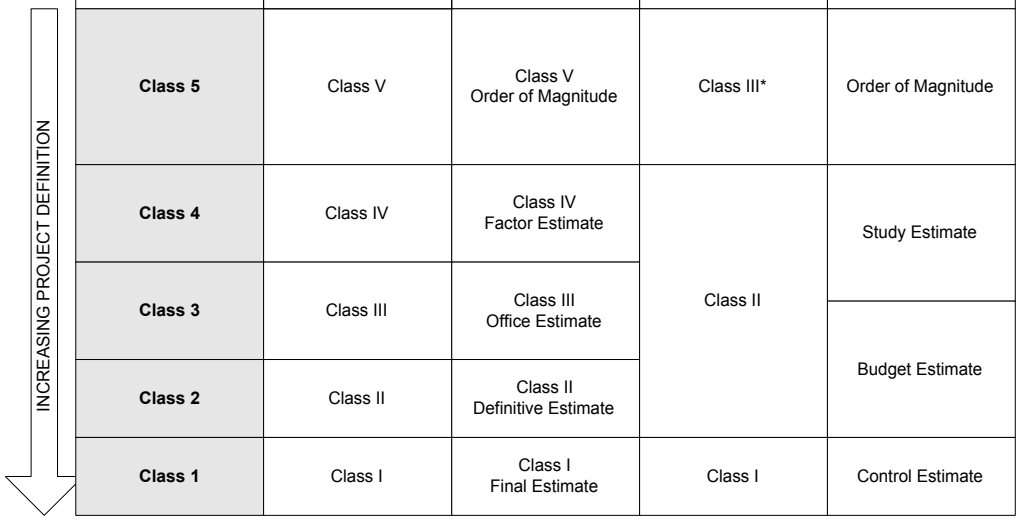
AACE Classification Standard	ANSI Standard Z94.0	AACE Pre-1972	Association of Cost Engineers (UK) ACostE	Norwegian Project Management Association (NFP)	American Society of Professional Estimators (ASPE)
Class 5	Order of Magnitude Estimate -30/+50	Order of Magnitude Estimate	Order of Magnitude Estimate Class IV -30/+30	Concession Estimate	Level 1
				Exploration Estimate	
				Feasibility Estimate	
Class 4	Budget Estimate -15/+30	Study Estimate	Study Estimate Class III -20/+20	Authorization Estimate	Level 2
Class 3		Preliminary Estimate	Budget Estimate Class II -10/+10	Master Control Estimate	Level 3
Class 2	Definitive Estimate -5/+15	Definitive Estimate	Definitive Estimate Class I -5/+5	Current Control Estimate	Level 4
Class 1		Detailed Estimate			Level 5
					Level 6

Figure 3a. – Comparison of Classification Practices



AACE Classification Standard	Major Consumer Products Company (Confidential)	Major Oil Company (Confidential)	Major Oil Company (Confidential)	Major Oil Company (Confidential)
Class 5	Class S Strategic Estimate	Class V Order of Magnitude Estimate	Class A Prospect Estimate	Class V
			Class B Evaluation Estimate	
Class 4	Class 1 Conceptual Estimate	Class IV Screening Estimate	Class C Feasibility Estimate	Class IV
			Class D Development Estimate	
Class 3	Class 2 Semi-Detailed Estimate	Class III Primary Control Estimate		Class III
			Class E Preliminary Estimate	
Class 2	Class 3 Detailed Estimate	Class II Master Control Estimate	Class F Master Control Estimate	Class II
Class 1		Class I Current Control Estimate	Current Control Estimate	Class I

Figure 3b. – Comparison of Classification Practices



AACE Classification Standard	J.R. Heizelman, 1988 AACE Transactions [1]	K.T. Yeo, The Cost Engineer, 1989 [2]	Stevens & Davis, 1988 AACE Transactions [3]	P. Behrenbruck, Journal of Petroleum Technology, 1993 [4]
Class 5	Class V	Class V Order of Magnitude	Class III*	Order of Magnitude
Class 4	Class IV	Class IV Factor Estimate	Class II	Study Estimate
Class 3	Class III	Class III Office Estimate		Budget Estimate
Class 2	Class II	Class II Definitive Estimate		
Class 1	Class I	Class I Final Estimate	Class I	Control Estimate

[1] John R. Heizelman, ARCO Oil & Gas Co., 1988 AACE Transactions, Paper V3.7
[2] K.T. Yeo, The Cost Engineer, Vol. 27, No. 6, 1989
[3] Stevens & Davis, BP International Ltd., 1988 AACE Transactions, Paper B4.1 (* Class III is inferred)
[4] Peter Behrenbruck, BHP Petroleum Pty., Ltd., article in Petroleum Technology, August 1993

Figure 3c. – Comparison of Classification Practices

ESTIMATE INPUT CHECKLIST AND MATURITY MATRIX

Figure 4 maps the extent and maturity of estimate input information (deliverables) against the five estimate classification levels. This is a checklist of basic deliverables found in common practice in the process industries. The maturity level is an approximation of the degree of completion of the deliverable. The degree of completion is indicated by the following letters.

- None (blank): development of the deliverable has not begun.
- Started (S): work on the deliverable has begun. Development is typically limited to sketches, rough outlines, or similar levels of early completion.
- Preliminary (P): work on the deliverable is advanced. Interim, cross-functional reviews have usually been conducted. Development may be near completion except for final reviews and approvals.
- Complete (C): the deliverable has been reviewed and approved as appropriate.

	ESTIMATE CLASSIFICATION				
General Project Data:	**CLASS 5**	**CLASS 4**	**CLASS 3**	**CLASS 2**	**CLASS 1**
Project Scope Description	General	Preliminary	Defined	Defined	Defined
Plant Production/Facility Capacity	Assumed	Preliminary	Defined	Defined	Defined
Plant Location	General	Approximate	Specific	Specific	Specific
Soils & Hydrology	None	Preliminary	Defined	Defined	Defined
Integrated Project Plan	None	Preliminary	Defined	Defined	Defined
Project Master Schedule	None	Preliminary	Defined	Defined	Defined
Escalation Strategy	None	Preliminary	Defined	Defined	Defined
Work Breakdown Structure	None	Preliminary	Defined	Defined	Defined
Project Code of Accounts	None	Preliminary	Defined	Defined	Defined
Contracting Strategy	Assumed	Assumed	Preliminary	Defined	Defined
Engineering Deliverables:					
Block Flow Diagrams	S/P	P/C	C	C	C
Plot Plans		S	P/C	C	C
Process Flow Diagrams (PFDs)		S/P	P/C	C	C
Utility Flow Diagrams (UFDs)		S/P	P/C	C	C
Piping & Instrument Diagrams (P&IDs)		S	P/C	C	C
Heat & Material Balances		S	P/C	C	C
Process Equipment List		S/P	P/C	C	C
Utility Equipment List		S/P	P/C	C	C
Electrical One-Line Drawings		S/P	P/C	C	C
Specifications & Datasheets		S	P/C	C	C
General Equipment Arrangement Drawings		S	P/C	C	C
Spare Parts Listings			S/P	P	C
Mechanical Discipline Drawings			S	P	P/C
Electrical Discipline Drawings			S	P	P/C
Instrumentation/Control System Discipline Drawings			S	P	P/C
Civil/Structural/Site Discipline Drawings			S	P	P/C

Figure 4. – Estimate Input Checklist and Maturity Matrix

REFERENCES

ANSI Standard Z94.2-1989. **Industrial Engineering Terminology: Cost Engineering**.
AACE International Recommended Practice No.17R-97, **Cost Estimate Classification System**.

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APPENDIX C - Station ‘Checklist’

Station Project Cost Classification System

(Based on the AACE International Recommend Practice No. 18R-97)

Station

Project class definitions and documentation required.

Class 5 (Identify)

Required Documentation

❒Planning Problem or Opportunity
- Explanation of problem/opportunity.
- Capital Planning Initiation Document (CPID) document initiated

❒Planning Project Definition
- From problem /opportunity project definition developed (progress into scope document)

❒Planning Sketches – SLD
- Lines, Feeders and Major Equipment only
- Communications SLD

❒Planning Sketches – GA
- Lines, Feeders and Major Equipment only

❒Planning System Documentation
- Load Flow Values
- Voltage Records
- Load information
- Customer information

❒Planning Initiation Document (CPID)
- Initiated for every Project

❒General Site Location
- Different site locations in the same general area

❒Options
- Site Locations
- Bus configurations
- Major Equipment

❒FortisBC Equipment Standards
- Identify any non-standard equipment

❒Schedule
- 1, 2 or 3 or more Years

❒Class 5 Estimate
- Produced from Planning Station Estimate Templates

❒Risks
- Identify risks associated with the project not moving ahead

❒Assumptions
- List of assumptions used in estimate that effects cost of project

❒Statistics
- Pertinent Stats if available

❒Operational Problems
- From SCC Outage Reports

❒Planning sign-off

❒Engineering sign-off

Once Planning and Engineering sign-offs are complete, the project can proceed to the Class 4 classification.

Class 4 (Evaluate)

Required Documentation

❒Planning Preliminary Scope Issued
- Issued by Planning to Engineering

❒Preliminary Construction Plan
- Starting quarter and ending quarter identified
- Identify construction constraints including weather, remote location etc.

❒Preliminary SLD
- Protection control SLD with relaying and metering identified.
- Communications equipment Identified.
- P&C Check CT, VT ratios & accuracies

❒Fault Current Study
- To determine equipment ratings and the requirement for a grounding study

❒Preliminary Material List
- Major long term delivery equipment identified

❒Final Site Location
- Site location has been determined and surveys and Geotechnical studies approved

❒Preliminary Site Plan
- Legal Plan acquired, station boundaries determined, footprint orientation determined

❒Preliminary GA
- Equipment arrangement in progress with all locations being determined

❒Preliminary Sections
- Verification of equipment locations
- Identify salvaged equipment

❒Class 4 Estimate
- Produced from Engineering Estimate Sheet

❒Preliminary Survey Data
- In progress

❒Preliminary Geotechnical Data
- In progress

❒Preliminary Schedule
- Engineering, Construction, and Commissioning schedules are determined

❒Business case started
- For Management/Directors approvals

❒Planning sign-off

❒Engineering sign-off

Once Planning and Engineering sign-offs are complete, the project can proceed to the Class 3 classification.

Class 3 (Define)

Required Documentation

❒Approved Planning Scope
- Operations signoff
- SCC sign-off

❒Approved Construction Plan
- Contingency plan including any by-pass installation
- Signoff by PMO and SCC

❒Approved SLD
- Signoff by P&C Engineer
- Signoff by Communications Engineer

❒Approved Logics
- Signoff by P&C Engineer

❒Material list complete
- Signoff by Electrical Engineer

❒Approved GA
- Signoff by Electrical Engineer

❒Approved Sections
- Signoff by Electrical Engineer

❒Approved Site Plan
- Signoff by Electrical Engineer

❒Preliminary Conduit Plan

❒Preliminary Grounding Plan
-Is there adequate insulating gravel

❒Approved Schedule
- Signoff by PMO
- Signoff by Project Engineer
- Signoff by SCC
- Signoff by Operations

❒Survey Data Complete
- Incorporated into the project design

❒Geotechnical Data Complete
- Incorporated into the project design

❒Grounding Study
- Existing stations may have previous studies with soil resistivity measurements

❒Preliminary Budget Set

❒Class 3 Estimate
- Produced from Class 4 Engineering Estimate Sheet

❒Business case completed

❒System Studies
- Completed

❒Load Studies
- Completed

❒Permits / Easements
- Identify which are required

Once sign-offs are complete, the project can proceed to the Class 2 classification.

Class 2 (Execute)

Part of Project Management Process and therefore not defined in this document.

Class 1 (Operate)

Part of Project Management Process and therefore not defined in this document.

APPENDIX D - Transmission ‘Checklist’

Transmission Project Cost Classification System

(Based on the AACE International Recommend Practice No. 18R-97)

Transmission

Project class definitions and documentation required.

Class 5 (Identify)

Required Documentation

❒Planning Problem or Opportunity
- Explanation of problem/opportunity.
- Capital Planning Initiation Document (CPID) document initiated

❒Planning Project Definition
- From problem /opportunity project definition developed (progress into scope document)
- Voltage, conductor/ampacity rating

❒Planning Sketches – SLD
- Line routes, switching, taps, and major equipment only

❒Planning Sketches – Maps
- Route maps

❒Planning System Documentation
- Load Flow Values
- Voltage Records
- Load information
- Customer information

❒General Route Location
- Start and finish locations
- Different routes in the same general area

❒Options
- Route options
- Structure types

❒FortisBC Equipment Standards
- Identify any non-standard equipment

❒Schedule
- 1, 2 or 3 or more Years

❒Class 5 Estimate
- Produced from FortisBC Designer Workbook

❒Risks
- Identify risks associated with the project not moving ahead

❒Assumptions
- List of assumptions used in estimate that effects cost of project.

❒Statistics
- Pertinent Statistics if available

❒Operational Problems
- From SCC outage reports

❒Planning sign-off

❒Engineering sign-off

Once Planning and Engineering sign-offs are complete, the project can proceed to the Class 4 classification.

Class 4 (Evaluate)

Required Documentation

❒Planning Preliminary Scope Issued
- Issued by Planning to Engineering

❒Preliminary Construction Plan
- Starting quarter and ending quarter identified

❒Preliminary SLD
- Major equipment Identified

❒Preliminary Material List
- Major long term delivery equipment identified

❒Preliminary Route Plan
- Legal Plan acquired, R/W boundaries determined
- Surveys and Geotechnical studies (if required) approved
- Potential lands/environmental issues identified

❒Preliminary Structure Locations
- Preliminary Structure types determined

❒Preliminary Profile
- Based on Government terrain models

❒Class 4 Estimate
- Produced from FortisBC Designer Workbook

❒Preliminary Survey Data
- In progress

❒Preliminary Geotechnical Data
- In progress

❒Preliminary Schedule
- Engineering, Construction, and Commissioning schedules are determined

❒Planning sign-off

❒Engineering sign-off

Once Planning and Engineering sign-offs are complete, the project can proceed to the Class 3 classification.

Class 3 (Define)

Required Documentation

❒Approved Planning Scope
- Operations signoff
- SCC sign-off

❒Approved Construction Plan
- Signoff by PMO
- Signoff by Project Engineer
- Signoff by SCC

❒Approved SLD
- Signoff by Project Engineer, SCC, Planning

❒Material list complete
- Signoff by Project Engineer

❒Approved Route Plan
- Lands issues resolution in progress
- Signoff by Project Engineer

❒Approved Schedule
- Signoff by PMO
- Signoff by Project Engineer
- Signoff by SCC
- Signoff by Operations

❒Finalized Structure Locations

❒Finalized Profile

❒Survey Data Complete
- Incorporated into the project design

❒Geotechnical Data Complete
- Incorporated into the project design

❒Preliminary Budget Set

❒Class 3 Estimate
- Produced from FortisBC Designer Workbook

❒Business case started

❒System Studies
- Completed

❒Load Studies
- Completed

Once sign-offs are complete, the project can proceed to the Class 2 classification.

Class 2 (Execute)

Part of Project Management Process and therefore not defined in this document

Class 1 (Operate)

Part of Project Management Process and therefore not defined in this document

APPENDIX E - Distribution ‘Checklist’

Distribution Project Cost Classification System

(Based on the AACE International Recommend Practice No. 18R-97)

Distribution

Project class definitions and documentation required.

Class 5 (Identify)

Required Documentation

❒Planning Problem or Opportunity
- Explanation of problem/opportunity.
- Capital Planning Initiation Document (CPID) document initiated

❒Planning Project Definition
- From problem /opportunity project definition developed (progress into scope document)
- Identify distribution feeder, voltage and conductor ampacity

❒Planning Sketches – SLD
- Line routes, switching (Isolation points), taps, and major equipment only

❒Planning Sketches – Maps
- Route maps

❒Planning System Documentation
- Load Flow Values
- Voltage Records
- Load information
- Customer information

❒General Route Location
- Different site routes in the same general area

❒Options
- Route options
-Structure types

❒FortisBC Equipment Standards
- Identify any non-standard equipment

❒Schedule
- 1, 2 or 3 or more Years

❒Class 5 Estimate
- Produced from FortisBC Designer Workbook

❒Risks
- Identify risks associated with the project not moving ahead.

❒Assumptions
- List of assumptions used in estimate that effects cost of project.

❒Statistics
- Pertinent Statistics if available

❒Operational Problems
- From SCC outage reports
- From operations or regional engineer

❒Planning sign-off

❒Engineering sign-off

Once Planning and Engineering sign-offs are complete, the project can proceed to the Class 4 classification.

Class 4 (Evaluate)

Required Documentation

❒Planning Preliminary Scope Issued
- Issued by Planning to Engineering

❒Preliminary Construction Plan
- Starting quarter and ending quarter identified

❒Preliminary SLD
- Line routes, isolation points, taps, and major equipment identified

❒Preliminary Material List
- Major long term delivery equipment identified

❒Preliminary Route Plan
- Legal Plan acquired, R/W boundaries determined
- Surveys and Geotechnical studies (if required) budgeted and approved
- Identify land issues

❒Preliminary Structure Locations
- Preliminary Structure locations & types determined
- Preliminary anchor locations determined

❒Preliminary Profile
- Based on Government terrain models
- Selection of structure locations

❒Class 4 Estimate
- Produced from FortisBC Designer Workbook

❒Preliminary Schedule
- Engineering, Construction, and Commissioning schedules are determined

❒Planning sign-off

❒Engineering sign-off

Once Planning and Engineering sign-offs are complete, the project can proceed to the Class 3 classification.

Class 3 (Define)

Required Documentation

❒Approved Planning Scope
- Operations signoff
- SCC sign-off

❒Approved Construction Plan
- Signoff by PMO
- Signoff by Engineering
- Signoff by SCC

❒Approved SLD
- Signoff by Regional Engineer
- Sign off by Operations

❒Materials
- Long lead materials finalized

❒Approved Schedule
- Signoff by PMO
- Signoff by Engineering
- Signoff by SCC
- Signoff by Operations

❒Preliminary Budget Set

❒Class 3 Estimate
- Produced from FortisBC Designer Workbook

❒Business case started

❒System Studies
- Completed

❒Load Studies
- Completed

❒R/W requirements identified (budget costs set)

If Required
- Land rights (private land, crown land)
- First Nations approval
- Ministry of Environment approval
- Municipal or Regional permitting
- Railways approval

Once sign-offs are complete, the project can proceed to the Class 2 classification.

Class 2 (Control)

Part of Project Management Process and therefore not defined in this document

Class 1 (Operate)

Part of Project Management Process and therefore not defined in this document

APPENDIX F - Generation ‘Checklist’

Generation Project Cost Classification System

(Based on the AACE International Recommend Practice No. 18R-97)

Generation

Project class definitions and documentation required.

Class 5 (Identify)

Required Documentation

❒Planning Initiation Document (CPID)
- Explanation of problem/opportunity
- Initiated for every project

❒Options Review
- Produced from Generation Preliminary Planning Approval Templates
- Risks Identified
- Major equipment
- Operation problems identified

❒Scope document
- Produced from Generation Scope Template
- Based on preferred option
- Site location
- Contracting out requirement.
- Plant or Unit Outage requirement
- Project Battery Limits

❒Project Rating – Generation Internal
- Produced from Generation Rating Template
- Safety, Environment, and Operational risks
- Used to determines approximate year in which project will be installed
- Used to determine estimate class requirement at this time

❒Class 5 Estimate
- Produced from Generation Estimate Templates
- Based on preferred option
- Assumptions
- Engineering discipline requirements
- Preliminary schedule
- Preliminary Cash Flow
- SAP historical cost information

❒Operations sign-off of complete Class 5 package

❒Planning sign-off of complete Class 5 package

❒Engineering sign-off of complete Class 5 package

Once Planning and Engineering sign-offs are complete, the project can proceed to the Class 4 classification.

Class 4 (Evaluate)

Required Documentation

❒Options Approval
- Produced from Generation Preliminary Planning Approval Templates
- Option costs
- Pros and Cons of selected option clearly stated
- Operations, engineering discipline sign off

❒Planning Scope Issued
- Issued by Planning to Engineering
- Based on selected option

❒Sketches and Preliminary Lists
- Documentation will vary depending on project type, and Engineering discipline.
- Document to be signed as reviewed by Engineering discipline

Minimum sketch requirement is:
- Equipment layout.
- Equipment lists, material quantities, long term delivery items identified
- Equipment sizing, single line drawing

❒Class 4 Estimate
- Produced from Generation Estimate Sheet
- SAP Historical Cost Information
- Budgetary Vendor Quotes
- WBS (Work Breakdown Structure) as part of estimate.
- EPCM (Engineering, Procurement, Construction Management) costs and man-hours estimated
- Cost of Removal estimated
- FortisBC labor man-hours identified
- Preliminary Schedule based on WBS, will indicate as a minimum engineering, construction and commissioning schedules

❒Preliminary Work Plan
- Starting quarter and ending quarter identified
- Identify construction constraints including weather, remote location, crane requirements, access, facilities etc.

❒Business case started
- For Management/Directors approvals

❒Planning sign-off of complete Class 4 package

❒Engineering sign-off of complete Class 4 package

Once Planning and Engineering sign-offs are complete, the project can proceed to the Class 3 classification.

Class 3 (Define)

Required Documentation

❒Approved Planning Scope
- Operations signoff
- SCC sign-off (as required)

❒Approved Work Plan
- Work Plan to be signed as reviewed by Operations, Engineering and SCC (if required)
- Site access
- Crane requirements and access
- On site facilities
- Management and labour resources
- Security

❒Drawings and Lists
- Documentation will vary depending on project type, and engineering discipline.
- Document to be signed as approved by engineering discipline.

Minimum Drawing Requirement:
- Equipment layout. Site Plan
- Equipment lists, material quantities, long term delivery items identified
- Equipment sizing, Single Line Drawing

❒Preliminary Specifications
- Operations signoff
- Engineering signoff

❒Approved Schedule
- Completed using MS Project
- Signoff by PMO
- Signoff by Project Engineer
- Signoff by SCC
- Signoff by Operations

❒Class 3 Estimate
- Produced from Generation Estimate Sheet
- SAP Historical Cost Information, inflation review
- Written Vendor quotes based on preliminary specification
- Confirmation of Contracting Out status

❒Preliminary Budget Set

❒Business case completed

Once sign-offs are complete, the project can proceed to the Class 2 classification.

Class 2 (Execute)

Part of Project Management Process and therefore not defined in this document

Class 1 (Operate)

Part of Project Management Process and therefore not defined in this document

APPENDIX G - BCUC Order G-50-10

BRITISH COLUMBIA UTILITIES COMMISSION

ORDER NUMBER G-50-10

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IN THE MATTER OF
The Utilities Commission Act, R.S.B.C. 1996, Chapter 473

and
2010 Certificates of Public Convenience and Necessity Application Guidelines

BEFORE: L.F. Kelsey, Commissioner
D.A. Cote, Commissioner March 18, 2010

O R D E R

WHEREAS:

A. The *Utilities Commission Act* (the Act) states in section 46(1) that an applicant for a Certificate of Public Convenience and Necessity (CPCN) must file with the British Columbia Utilities Commission (the Commission) information, material, evidence and documents that the Commission prescribes; and

B. On March 31, 2004 the Commission, by Order G-28-04, issued its "Guidelines for CPCN Applications" which established the required procedure and information for CPCN applications under the Act; and

C. On September 16, 2009, the Commission issued draft 2009 CPCN Application Guidelines for a 60-day comment period from regulated utilities and the public; and

D. Comments were received from British Columbia Hydro and Power Authority , British Columbia Transmission Corporation, FortisBC Inc., Pacific Northern Gas Ltd., Skeetchestn Indian Band and Terasen Utilities; and

E. The Commission has reviewed the comments and considers that the establishment of the 2010 CPCN Application Guidelines is warranted.

NOW THEREFORE the Commission orders as follows:

1. Commission Order G-28-04 is cancelled.

BRITISH COLUMBIA UTILITIES COMMISSION

ORDER NUMBER G-50-10

2. An application for a CPCN pursuant to sections 45 and 46 of the Act is to be made in a form that satisfies the requirements outlined in Appendix A to this Order.

DATED at the City of Vancouver, in the Province of British Columbia, this 18th day of March 2010.

BY ORDER

Original signed by:

D.A. Cote
Commissioner

Attachment

APPENDIX A
to Order G-50-10

British Columbia Utilities Commission

2010 Certificates of Public Convenience and Necessity

Application Guidelines

APPENDIX A
to Order G-50-10

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PURPOSE AND SCOPE OF GUIDELINES

The purpose of these guidelines is to assist public utilities and other parties wishing to construct or operate utility facilities in preparing their applications for a Certificate of Public Convenience and Necessity (CPCN) so the review of these applications by the British Columbia Utilities Commission (Commission) can proceed as efficiently as possible. The Commission expects CPCN applications will generally be prepared in accordance with the guidelines.

Section 45(1) of the Utilities Commission Act (UCA) requires that 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 CPCN approving the construction or operation. Section 46(1) of the UCA requires an application for a CPCN be filed with Commission.

A copy of the UCA can be found at http://www.qp.gov.bc.ca/statreg/stat/U/96473_01.htm

The guidelines do not alter the fundamental regulatory relationship between utilities and the Commission. They provide general guidance regarding the Commission's expectations of the information that should be included in CPCN applications while providing the flexibility for an application to reflect the specific circumstances of the applicant, the size and nature of the project, and the issues that it raises. An applicant is expected to apply the guidelines in a flexible and reasonable manner. The Commission may issue further directions relating to the information to be included in specific CPCN applications and may require applicants to provide further information to supplement material in filed applications.

CPCN applications may be supported by long-term resource plans filed under section 44.1 of the UCA. These long-term resource plans may deal with significant aspects of project justification, particularly the need for the project and the assessment of the overall costs and benefits of the project and alternatives to the project. Under section 44.1(9) of the UCA, in approving a long-term resource plan, the Commission may order that a proposed utility plant or system, or an extension of either, is exempt from the requirements of section 45(1) of the UCA.

Public utilities and other project proponents are encouraged to initiate discussions with appropriate government agencies and consult with the public and potentially affected First Nations as early as possible in the planning and design phase of a project in order to gain an understanding of the issues to be addressed prior to the filing of an application.

DEEMED CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY

Sections 45(2), 45(5) and 45(6) of the UCA state:

> (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.
>
> (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.

In order to evaluate whether a public utility should apply for a CPCN for a specific extension to a utility plant or system and therefore whether to make an order pursuant to section 45(5), the Commission needs to be aware of planned extensions that are significant. This information is provided in the statement of planned extensions that a public utility is required to file at least once a year. The statement should be filed in a timely fashion and should identify each discrete extension to a utility plant or system that may have a material impact on customer rates or raise some other significant issue. The statement should include all extensions that the utility is likely to initiate over the period until the filing of the next statement on extensions, and should use a definition of extension that is as broad and inclusive as possible. A utility should inform the Commission in the event it plans to initiate a significant extension that was not identified in its most recent statement on extensions.

A long-term resource plan filed pursuant to section 44.1 of the UCA or a capital expenditure schedule filed pursuant to section 44.2(1)(b) may meet the requirements of section 45(6) provided it is filed prior to the start of the construction of the extensions. Also, section 45(4) provides that the Commission may, by regulation, exclude utility plant or categories of utility plant from the operation of section 45(1). Under this provision, the Commission may establish project thresholds relating to size, production capacity, type and absence of local impacts that will determine projects that would generally not require a CPCN application.

PROCEDURAL CONSIDERATIONS

An application for a CPCN pursuant to sections 45 and 46 of the UCA will be made to the Secretary of the Commission. Applications are to be filed in accordance with the Commission's document filing protocols. A text recognizable and bookmarked electronic copy with working spreadsheets and 12 hard copies of the completed and signed CPCN application should be submitted. Applications are typically made public, except where special circumstances require confidentiality.

The filed application is initially reviewed by the Commission for possible deficiencies and any additional information is requested through an information request which is responded to by the applicant. Once the response to the information request is received, the application is reviewed by the Commission to understand the application, identify any additional deficiencies, and make a preliminary determination as to whether a hearing is required, and if required, the nature of the proceeding. Pursuant to section 46(2), the Commission may establish an oral or written hearing and regulatory timetable if further review of the application is required.

The Commission makes a determination on disposition of the CPCN application as follows:

(a) Grant a CPCN without further input from the applicant or other interested parties.

(b) Require further information from the applicant.

(c) Set down an oral or written public hearing.

(d) Deny the application.

Approval of a CPCN application results in the Commission issuing an order to the applicant granting the CPCN. The order may include terms and conditions which the Commission believes the public convenience or necessity require.

For further information, contact:

Commission Secretary
British Columbia Utilities Commission
Sixth Floor, 900 Howe Street
Vancouver, B.C.
V6Z 2N3

Telephone: (604) 660-4700
Toll Free: 1-800-663-1385
Facsimile: (604) 660-1102
Commission.Secretary@bcuc.com
web site: http://www.bcuc.com

APPLICATION REQUIREMENTS

An application under sections 45 and 46 of the UCA should contain the following information:

1. Applicant

   (i) Name, address and description of the nature of the applicant's business and all other persons having a direct interest in project ownership or management;

   (ii) Evidence of the financial and technical capacity of the applicant and other persons involved, if any, to undertake and operate the project;

   (iii) Name, title and address of the person with whom communication should be made respecting the application;

   (iv) Name and address of legal counsel for the applicant, if any;

   (v) Organizational chart of the project team, including the names of the Project Manager and Executive Sponsor for the project; and

   (vi) Outline of the regulatory process the applicant recommends for the Commission's review of the application, including how persons who were consulted about the project can raise outstanding application-related concerns with the Commission.

2. Project Need, Alternatives and Justification

   (i) Studies or summary statements identifying the need for the project and confirming the technical, economic and financial feasibility of the project, identifying assumptions, sources of data, and feasible alternatives considered. The applicant should identify alternatives that it deemed to be not feasible at an early screening stage, and provide the reason(s) why it did not consider them further;

(ii) A comparison of the costs, benefits and associated risks of the project and feasible alternatives, including estimates of the value of all of the costs and benefits of each option or, where these costs and benefits are not quantifiable, identification of the cost or benefit that cannot be quantified. Cost estimates used in the economic comparison should have, at a minimum, a Class 4[1] degree of accuracy as defined in the Advancement of Cost Engineering ("AACE International") Recommended Practice No. 10S-90, Cost Engineering Terminology (May 20, 2009);

(iii) A schedule calculating the revenue requirements of the project and feasible alternatives, and the resulting impacts on customer rates;

(iv) A schedule calculating the net present values of the incremental cost and benefit cash flows of the project and feasible alternatives, and justification of the length of the term and discount rate used for the calculation;

(v) A schedule and supporting discussion comparing the project and feasible alternatives in terms of social and environmental factors, and the applicant's assessment regarding the overall social and environmental impact of the project relative to the overall impact of the feasible alternatives; and

(vi) Information relating the project to the applicant's approved long-term resource plan filed pursuant to section 44.1 of the UCA, including the extent to which the project was considered in the plan, and, if applicable, a discussion explaining how the plan provides support and justification for the need for the project.

[1] Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval.

3. Consultation

First Nations Consultation

Note: Crown utilities are required to provide the information requirements set out in the British Columbia Utilities Commission 2010 First Nations Information Filing Guidelines for Crown Utilities, which replace and supersede the application requirements in this First Nations Consultation section of the CPCN Application Guidelines.

If an applicant is of the view that the application does not require consultation with First Nations, reasons supporting its conclusion should be provided to the Commission. Unless otherwise justified, the following information should be filed:

(i) Identification of the First Nations potentially affected by the application or filing, including the feasible project alternatives; and the information considered to identify these First Nations.

For each potentially affected First Nation, summarize the consultation to date, including:

(ii) Identification of any group, body, specific band or specific person(s) that have been consulting on behalf of the First Nation in connection with the application. Identify the specific member bands represented by any group or body;

(iii) A chronology of meetings, other communications and actions;

(iv) Any relevant, non-confidential written documentation regarding consultation, such as notes or minutes of meetings or phone calls, or letters received from or sent to the First Nation;

(v) Identification of specific issues or concerns raised by the First Nation;

(vi) Description of how the specific issues or concerns raised by the First Nation were avoided, mitigated or otherwise accommodated; or explain why no further action is required to address an issue or concern;

(vii) Copies of any documents which confirm that the First Nation is satisfied with the consultation to date;

(viii) Evidence that the First Nation has been notified of the filing of the application with the Commission and has been informed on how to raise outstanding concerns with the Commission; and

(ix) The applicant's overall view as to the sufficiency of the consultation process with the First Nation to date, in the context of the decision which is being sought from the Commission.

Public Consultation

(i) Overview of the community, social and environmental setting in which the project and its feasible alternatives will be constructed and operated, and of the public who may be directly impacted by the project and its feasible alternatives;

(ii) Description of the information and consultation programs with the public, including the organizations, agencies and individuals consulted, the information provided to these parties, and a chronology of meetings and other communications with members of the public and their representatives. This includes consultation with both the public who may be directly impacted by the project and the public that may experience impacts on their rates and service;

(iii) Description of the issues and concerns raised during consultations, the measures taken or planned to address issues or concerns, or an explanation of why no further action is required to address an issue or concern;

(iv) Identification of any outstanding issues or concerns; and

(v) Applicant's overall assessment as to the sufficiency of the public consultation process with respect to the project, in the context of the decision which is being sought from the Commission.

4. Project Description

(i) Description of the project, its purpose and cost, including engineering design, capacity, location options and preference, safety and reliability considerations, and all ancillary or related facilities that are proposed to be constructed, owned or operated by the applicant;

(ii) Outline of the anticipated construction and operation schedule, including critical dates of key events, a chart of major activities showing the critical path (e.g., GANTT[2] chart), and the timing of approvals required from other agencies to ensure continued economic viability;

(iii) Description of any new or expanded public works, undertakings or infrastructure that will result from or be required by the project, and an estimate of the costs and necessary completion dates;

(iv) Human capital resources required to undertake the project;

(v) Risk analysis identifying all significant risks to successful completion of the project, including an assessment of the probability of each risk occurring, and the consequences and the cost to mitigate the risk;

(vi) Identification and preliminary assessment of potential effects of the project on the physical, biological and social environments or on potentially affected First Nations and the public, proposals for reducing potentially negative effects and maximizing benefits from positive effects, and the cost to the project of implementing the proposals;

(vii) Identification of the customers to be served by the project and, where the project would expand the area served by the applicant, a geographical description of the expanded service area;

[2] GANTT chart is a bar chart which illustrates a project schedule.

(viii) List of all required federal, provincial and municipal approvals, permits, licenses or authorizations; and

(ix) Summary of the material conditions that are anticipated in federal, provincial and municipal approvals and confirmation that the costs of complying with these conditions are included in the cost estimate in the application.

5. Project Cost Estimate

(i) Project cost estimate, including a description of the method of estimating used, the percentage of engineering completed at the time of the estimate, and identification and justification of all assumptions, exclusions, inflation and discount factors, and sources of benchmarks and other data;

(ii) The cost estimate should be stated in nominal as well as real dollars, identify an expected accuracy range and have, at a minimum, a Class 3[3] degree of accuracy as defined in AACE International Recommended Practice No. 10S-90, Cost Engineering Terminology (May 20, 2009);

(iii) The cost estimate should provide:

(a) Any funds spent in prior years attributable to the project;
(b) A list of all project direct and indirect costs using a work breakdown structure by year until completion;
(c) Escalation (including inflation) amounts;
(d) Contingency amount;
(e) Interest during construction or allowance for funds used during construction and corporate overhead;
(f) Identification and explanation of any management or other reserves;

[3] Class 3 estimates are typically prepared to support full project funding requests, and become the first project phase "control estimate" against which all actual costs and resources will be monitored for variations to the budget. They are used as the project budget until replaced by more detailed estimates.

(g) Any legal, regulatory and other non-project costs, including costs associated with First Nations and public consultation and accommodation.

(iv) Identification of any cost items not included in the estimate, including transportation costs, and the reason for the exclusion; and

(v) If a Monte Carlo[4] analysis was used to model and back-up the amount of project contingency included in the cost estimate, the base estimate, P50 expected value estimate, P90 estimate, histogram and cumulative curves, and tornado graphs.

6. Provincial Government Energy Objectives and Policy Considerations

(i) Discuss how the project is consistent with and will advance the government's energy objectives as set out in the UCA. If the nature of the project precludes a direct link to the energy objectives, the application should discuss how the project does not hamper other projects or initiatives undertaken by the applicant or others, from advancing these energy objectives;

(ii) Discuss how the project relates to and supports the Province's electricity self-sufficiency goals as set out in 64.01 of the UCA or as set out in Special Direction No. 10 to the Commission, if applicable; and

(iii) Where the applicant is BC Hydro or a prescribed public utility, discuss how the project relates to and supports the Province's clean and renewable electricity goal as set out in 64.02 of the UCA, if applicable.

7. New Service Areas

(i) Telephone number or other means by which customers will be able to contact the utility, particularly regarding an emergency;

(ii) Description of facilities and trained personnel that will provide emergency response;

[4] Monte Carlo analysis involves using random numbers and probability to solve problems.

(iii) Tariff including terms and conditions of service, rate schedules and initial rates the applicant proposes for customers in the new service area; and

(iv) Information confirming the proposed rates will be competitive with other service options that are available to customers in the new service area.

Chernikhowsky, Paul

From: Chernikhowsky, Paul
Sent: July-13-10 6:30 PM
To: Klashinsky, Curtis
Cc: Ward, Martin
Subject: FBC/AACE Estimating checklists
Attachments: FBC Estimating.xls

Hey Curtis,

Martin has taken a stab a documenting some of the things I have proposed in terms of a FortisBC estimating philosophy based on the AACE guidelines. As discussed, this is a something we need to get a start on immediately so that people have a common frame of reference as they are estimating their ISP projects. I'd like to have a fairly complete draft document available by the early August.

A couple of stream-of-consciousness thoughts:

- What I have in mind is a set of simple, easy-to-understand checklists which can be used to confirm compliance with a given AACE/FBC estimate class
- Ideally, different people should be able to use the checklist without being a skilled estimator and yet still arrive at similar results
- Note that the person completing this checklist is NOT necessarily the one doing the estimate – they are simply the one verifying its validity
- I'd like to have one sheet each for Class 5, Class 4 and Class 3 estimates
- Each sheet should have requirements that are business-area specific (i.e. a "Distribution" estimate probably won't need to consider geotech, but a "Stations" job probably wouldn't need to worry about railway crossing permits).
- General things that also need to be assessed (as per Martin's text below) are: a "risk premium", contingency and other allowances.
- Some sort of short "interpretation guide" will likely need to be developed for each checkbox to explain a bit more what it means (i.e. does "Site survey reviewed/considered" mean a current survey was commissioned, or we are using a paper tracing from 50 years ago?).

That's all I can think of for now. Hope this helps and have a great time with the Terasen folks!

Paul M. Chernikhowsky, P.Eng.
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paul.chernikhowsky@fortisbc.com

From: Ward, Martin
Sent: July 8, 2010 10:19 AM
To: Chernikhowsky, Paul
Subject: ISP 15 Minutes on this - course of action CEP - Contingency / Management Reserve and Risk Premiums

We need to define some of these terms within the context of our estimating process.

Attached is a sample of FBC interpretation of AACE guidelines – for discussion no more

CONTINGENCY – An amount added to an estimate to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows will likely result, in aggregate, in additional costs. Typically estimated using statistical analysis or judgment based on past asset or project experience. Contingency usually excludes: 1) Major scope changes such as changes in end product specification, capacities, building sizes, and location of the asset or project; 2) Extraordinary events such as major strikes and natural disasters; 3) Management reserves; and 4) Escalation and currency effects. Some of the items, conditions, or events for which the state, occurrence, and/or effect is uncertain include, but are not limited to, planning and estimating errors and omissions, minor price fluctuations (other than general escalation), design developments and changes within the scope, and variations in market and environmental conditions. Contingency is generally included in most estimates, and is expected to be expended. See: MANAGEMENT RESERVE. (1/04)

FBC – amount for known unknowns

How do we establish $ values ?

MANAGEMENT RESERVE – An amount added to an estimate to allow for discretionary management purposes outside of the defined scope of the project, as otherwise estimated. Use of management reserve requires a change to the project scope and the cost baseline, while the use of contingency reserve funds is within the project's approved budget and schedule baseline. Syn.: RESERVE; RESERVE ALLOWANCE. (6/07)

FBC – amount for unknown unknowns arise from risk assessment ???

RISK –
(1) The degree of dispersion or variability around the expected or "best" value which is estimated to exist for the economic variable in question, e.g., a quantitative measure of the upper and lower limits which are considered reasonable for the factor being estimated.
(2) An ambiguous term that can mean any of the following: a) All uncertainty (threats + opportunities); or b) Downside uncertainty (a.k.a. threats); or c) The net impact or effect of uncertainty (threats – opportunities). The convention used should be clearly stated to avoid misunderstanding.
(3) Probability of an undesirable outcome. See: OPPORTUNITY; EVENT; CONDITION (UNCERTAIN); THREAT; UNCERTAINTY. (6/07)

RISK – PROJECT-SPECIFIC
A risk taxonomy designation used to classify project risks for the purposes of selecting a quantification method (i.e., contingency determination). Project-specific risks are uncertainties (threats or opportunities) related to events, actions, and other conditions that are specific to the scope of a project. (e.g., weather, soil conditions, etc.). The impacts of project-specific risks are more or less unique to a project. The historically inconsistent project-specific nature of the risk-to-impact relationship favors the use of more deterministic methods of quantification such as expected value calculations. In this taxonomy usage, it is the opposite of "systemic" risks. See: RISK; RISK – SYSTEMIC. (1/09)

RISK – SYSTEMIC
A risk taxonomy designation used to classify project risks for the purposes of selecting a quantification method (i.e., contingency determination). Systemic risks are uncertainties (threats or opportunities) that are an artifact of an industry, company or project system, culture, strategy, complexity, technology, or similar over-arching characteristics. The historically consistent nature of the systemic risk-to-impact relationship favors the use of methods such as empirically-based parametric modeling for quantification. In this taxonomy usage, it is the opposite of "project-specific" risks. See: RISK; RISK – PROJECTSPECIFIC. (1/09)

RISK ANALYSIS – A risk management process step, which includes the quantification of the effect of all uncertainty (risks) on a project. Usually done by identifying risks and quantifying each risk's probability of occurrence, and potential severity of impact. Note: The impact may be expressed as a range of values, or with a confidence level, or as a probability distribution. (6/07)

RISK ANALYSIS METHOD – The technique used to analyze the risks associated with a project or

program. Specific categories of risk analysis methods are:
1) Qualitative - based on project characteristics and historical data (check lists, scenarios, etc.)
2) Risk models - combination of risks assigned to parts of the estimate or project to define the risk of the total project.
3) Probabilistic models - combining risks from various sources and events (e.g., Monte Carlo, Latin hypercube, decision tree, influence diagrams, etc.) (6/07)

RISK ASSESSMENT – A risk management process step, which includes the identification of risks or uncertainties which may impact a project. (6/07)

RISK CONTROL – A risk management process step which includes the implementation of the risk management plan. (6/07)

RISK MANAGEMENT – All of the steps (phases) associated with managing risk (risk assessment, risk analysis, risk mitigation, risk control. See: RISK ANALYSIS; RISK ASSESSMENT; RISK MANAGEMENT PLAN; RISK MITIGATION; RISK CONTROL. (6/07)

RISK MANAGEMENT PLAN – The product of risk mitigation which includes a list of the action steps to: 1) Eliminate or reduce the probability of a threat occurring; and/or 2) Eliminate or reduce the impact of the threat if it does occur (mitigate the threat); and/or 3) Assure or increase the probability of an opportunity occurring; and/or 4) Increase the impact of an opportunity if it does occur. The plan includes predefined action steps to be taken and the "trigger points" that will indicate when they are to be executed to mitigate risks. The plan also defines what to monitor to determine the "trigger points". The steps may include, holding portion of funds and/or scope in reserve, until outcome is more certain; trading cost risk for schedule or quality risk; and/or buying "insurance" (such as lump sum, firm price subcontracts). (6/07)

RISK MITIGATION –
(1) The risk management process step that includes developing a risk management plan.
(2) Action to reduce, transfer, or eliminate risk. (6/07)

RISK SOURCES – Events or conditions that have been defined for use in Risk Assessment that might affect the outcome of a project. Risk sources are frequently subdivided into the following groups, based on the underlying source of the source: 1) Business needs risks; 2) Results definition risks; 3) Scope definition risks; 4) Execution plan, mastery and processes risks; and 5) External risks. See: CONDITION; EVENT. (6/07)

RISK TYPES – A means of characterizing risk for use in risk assessment by the type of risk: 1) Inherited - derived from preceding stages of project; 2) Economic - associated with availability and costs of resources; 3) Commercial - associated with customers needs and wants, competition, etc.; 4) Technological - associated with ability to achieve desired results, produce products, etc. life of current or new technology and compatibility of new technologies; and 5) Implementation - ability to meet project plan and commitments due to human behavior or organizational factors. (6/07)

RISK-ADJUSTED CRITICAL PATH – Undeveloped theory that proposes using non-deterministic activity durations when considering the determination of the critical path. (3/10)

stochastic

Etymology: Greek *stochastikos* skillful in aiming, from

stochazesthai to aim at, guess at, from *stochos* target,

aim, guess — more at sting

Date: 1934

1 : random; s*pecifically* **:** involving a random variable
<a stochastic process>
2 : involving chance or probability : probabilistic <a stochastic model of radiation-induced mutation>

Martin Ward
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	Primary Characteristic	Secondary Characteristic			
	LEVEL OF PROJECT DEFINITION	**END USAGE**	**METHODOLOGY**	**EXPECTED ACCURACY RANGE**	**PREPARATION EFFORT**
ESTIMATE CLASS	Expressed as % of complete definition	Typical purpose of estimate	Typical estimating method	Typical variation in low and high ranges [a]	Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
Class 3	10% to 40%	Budget,Authorization, or Control	Semi-Detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10
Class 2	30% to 70%	Control or Bid/Tender	Detailed Unit Cost with Forced Detailed Take-Off	L: -5% to -15% H: +5% to +20%	4 to 20
Class 1	50% to 100%	Check Estimate or Bid/Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

[a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.

[b] If the range index value of “1” represents 0.005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

	Primary Characteristic	Secondary Characteristic			
	LEVEL OF PROJECT DEFINITION	**END USAGE**	**METHODOLOGY**	**EXPECTED ACCURACY RANGE**	**PREPARATION EFFORT**
ESTIMATE CLASS	Expressed as % of complete definition	Typical purpose of estimate	Typical estimating method		Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	ISP beyond first 5 Years	Capacity Factored, Parametric Models, Judgment, or Analogy	Typical Range -30% to +50%	1
Class 4	1% to 15%	ISP/CEP year 3-5	Equipment Factored or Parametric Models	Typical Range -30% to +50% or -20 to +30	2 to 4
Class 3	10% to 40%	CEP and CPCN	per check lists	Typical Range -15% to +20%	3 to 10
Class 2	30% to 70%	Control Estimates	Detailed Unit Cost with Forced Detailed Take-Off	Typical Range -5% to +15%	4 to 20
Class 1	50% to 100%	typically not done	Detailed Unit Cost with Detailed Take-Off	Typical Range -5% to +15%	5 to 100

[a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.

[b] If the range index value of “1” represents 0.005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

FBC Typical Station	Primary Characteristic	Secondary Characteristic			
	LEVEL OF PROJECT DEFINITION	**END USAGE**	**METHODOLOGY**	**EXPECTED ACCURACY RANGE**	**PREPARATION EFFORT**
ESTIMATE CLASS	Expressed as % of complete definition	Typical purpose of estimate	Typical estimating method	Typical variation in low and high ranges [a]	Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	ISP / SDP more than five years out	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
			rules of thumb and recent history	Typical Range - 30% to +50%	
Class 4	1% to 15%	ISP/CEP year 3-5	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
			detailed history	Typical Range - 15% to +30%	
			Eng / PM / Operations review		
Class 3	10% to 40%	CEP and CPCN	per check list	L: -10% to -20% H: +10% to +30%	3 to 10
			1 GA and UGA	Typical Range - 15% to +20%	
			2 Project / Construction Schedule		
			3 Major Equipment quotes		
			4 3D model and Site Prep Estimate		
			5 Detailed GeoTech		
			6 Lands - Zoning and ALC resolved - land under Option to purchase		
			7 Risk Mitigation Plan		
			8 PM /CM signoff on estimate		
Class 2	30% to 70%	Control Estimates after Engineering complete	Detailed Unit Cost,Detailed Take-Off, Site/ Civil completed	L: -5% to -15% H: +5% to +20%	4 to 20
			1 all land issues resolved	Typical Range - 5% to +15%	
			2 detailed construction schedule		
			3 contracts in place for major equipment and labour contracts (site, civil, electrical and physical)		
			4 site preparation complete		
			5 engineering complete		
Class 1	50% to 100%	Check Estimate or Bid/Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

[a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.

[b] If the range index value of “1” represents 0.005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

FBC Typical Line	Primary Characteristic	Secondary Characteristic		
	LEVEL OF PROJECT DEFINITION	**END USAGE**	**METHODOLOGY**	**EXPECTED ACCURACY RANGE**
ESTIMATE CLASS	Expressed as % of complete definition	Typical purpose of estimate	Typical estimating method	Typical variation in low and high ranges [a]
Class 5	0% to 2%	ISP / SDP more than five years out	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%
			1 factors - $/span	Typical Range -30% to +50%
Class 4	1% to 15%	ISP/CEP year 3-5	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%
			1 distribution costing model	Typical Range -15% to +30%
			2 transmission - cost history	
			3 lands issues identified	
			4 joint use issues identified	
			5 PM / CM review of estimate	
Class 3	10% to 40%	CEP and CPCN	per check list	L: -10% to -20% H: +10% to +30%
			1 GA and UGA	Typical Range -15% to +20%
			2 Project / Construction Schedule	
			3 Major Equipment quotes	
			4 3D model and Site Prep Estimate	
			5 Detailed GeoTech	
			6 Lands - Zoning and ALC resolved	
			7 PM /CM signoff on estimate	
			8 joint use issues resolved	
			9 Risk Mitigation Plan	
Class 2	30% to 70%	Control Estimates after Engineering complete	Detailed Unit Cost,Detailed Take-Off, Site/ Civil completed	L: -5% to -15% H: +5% to +20%
Class 1	50% to 100%	Check Estimate or Bid/Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%

[a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.

[b] If the range index value of “1” represents 0.005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

1.0 Reference: Exhibit A2-13, BCUC 3.1 - 1st Progress Report

Exhibit A2-1, 2nd Progress Report

Exhibit A2-3, 3rd Progress Report

1.1 Progress Report #3 (page 1) states that the cost of project remains unchanged from the previous report at $28.09 M. Progress Report #2 (page 1) states that the cost of the project is unchanged from the previous quarter at $28.09 M. However, Progress Report #1 states that the cost of the project is $28.39 M. Please reconcile.

Response:

FortisBC confirms that there was a typographical error in the second Progress Report that was carried forward to the third Progress Report. The correct forecast for both reports should have read $28.39 million.

1.2 Please provide a schedule that documents the various revisions that were made to the estimated overall cost of the Project from the time of the Approval of the CPCN through to project completion. For each change please indicate i) the revised cost estimate, ii) when FortisBC's management revised the cost of the project and iii) when the BCUC was notified of the change

Response:

Please see the table below.

Date FortisBC Revised	Date BCUC Notified	Document or Milestone	Forecast ($millions)
	August 15, 2006	CPCN Approval	$21.48
May 2007	June 20, 2007	Meeting with Commission	$28.39
June 30, 2007	July 27, 2007	Progress Report No. 1	$28.39
September 30, 2007	October 31, 2007	Progress Report No. 2	$28.09[1]
December 31, 2007	January 30, 2008	Progress Report No. 3	$28.09[1]
March 31, 2008	May 12, 2008	Progress Report No. 4	$28.31
June 30, 2008	July 29, 2008	Progress Report No. 5	$28.31
September 30, 2008	October 31, 2008	Progress Report No. 6	$28.44
December 31, 2008	January 30, 2009	Progress Report No. 7	$28.50
March 31, 2009	May 1, 2009	Progress Report No. 8	$28.50
June 30, 2009	July 31, 2009	Progress Report No. 9	$28.50
September 30, 2009	October 30, 2009	Progress Report No. 10	$28.50
December 31, 2009	January 29, 2010	Progress Report No. 11	$28.50
March 31, 2010	April 30, 2010	Progress Report No. 12	$28.50
December 31, 2010	May 6, 2011	Progress Report No. 13	$28.67

[1] Typo in report, forecast should have read $28.39M.

2.0 Reference: Exhibit A2-13, BCUC 3.1 – 1st Progress Report, page 3 of 7
Exhibit B-10, BCUC 6.3 and 10.5
Exhibit B-10, BCUC 11.2

2.1 Please confirm the $21.48 M cost of project identified in the CPCN was expressed in 2005 $.

Response:

FortisBC confirms that the $21.48 million cost identified in the CPCN was expressed in 2005 dollars.

2.2 Similarly, please confirm the basis for the $28.39 M cost quoted in the 1st Progress Report. Was it expressed in nominal $?

Response:

FortisBC confirms that the $28.39 million quoted in the first quarterly Progress Report was expressed in nominal dollars.

2.3 What were the provisions for AFUDC, capital overheads, contingency and salvage included in the $28.39 M estimate?

Response:

The $28.39 million revised estimate included:

Cost	$millions
AFUDC	1.35
Capitalized Overhead	0.20
Contingency	0.78
Salvage	1.15

2.4 The response to BCUC 6.3 states that "inflationary parameters were assumed to be covered within the limits of project contingency". Please indicate how much the total project contingency ($0.79 M per BCUC 11.2) included in initial $21.48 M cost estimate was related to inflationary parameters.

Response:

As contingency was calculated on a percentage basis for individual projects, with no explicit provision made for a particular amount of contingency related to inflationary parameters, it is not possible to provide a specific amount related to inflation. As explained in the response to BCUC IR1 Q10.3.1 and Q10.5, the project estimates were based on recently completed projects and incorporated a contingency allowance which was expected to absorb reasonable variances and escalations, including the effect of inflation, in project costs. Please also see response to BCPSO IR1 Q12.1 below.

2.5 What was the actual impact of inflation (over 2005 base $) on the Project's final costs?

Response:

FortisBC's estimated actual impact of inflation (over 2005 base $ and based on annual CPI rates) on the Project's final costs has been shown in the table below:

Kettle Valley Actual Expenditure	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**Total**
Kettle Valley Project Actual Expenditure	0.95	1.90	18.38	4.80	0.47	0.00	0.00	**26.50**
Kettle Valley Salvage Actual Expenditure	-	-	0.02	0.81	0.18	1.17	-0.00	**2.17**
Kettle Valley Actiual Expenditure	**0.95**	**1.90**	**18.40**	**5.62**	**0.65**	**1.17**	**-0.00**	**28.67**

Kettle Valley Projected Expenditure in 2005$	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**Total**
Actual BC CPI Rates	102%	102%	102%	102%	100%	101%	102%	
Kettle Valley Expenditure Projected in 2005$	0.95	1.87	17.76	4.51	0.47	-	-	**25.56**
Kettle Valley Salvage Cost Projected in 2005$	-	-	0.02	0.76	0.18	1.08	-0.00	**2.04**
Kettle Valley Expenditure Projected in 2005 $	**0.95**	**1.87**	**17.78**	**5.27**	**0.65**	**1.08**	**-0.00**	**27.60**

Inflationary Variance (CPI Related only)	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**Total**
Kettle Valley Project Cost - CPI effect	-	0.03	0.61	0.29 -	0.00	-	-	**0.94**
Kettle Valley Salvage Cost - CPI Effect	-	-	0.00	0.05 -	0.00	0.08	-0.00	**0.13**
Kettle Valley Projected Expenditure in 2005 $	**-**	**0.03**	**0.61**	**0.34 -**	**0.00**	**0.08**	**-0.00**	**1.07**

2.6 If inflation had been 2% per annum how would this have impacted the final cost of project – assuming the initial cost estimate was correct in all other regards and there was no other use required for the contingency allowance of $0.79 M.

Response:

If inflation had been 2% per annum the impact on the final project cost estimate – assuming the initial cost estimate was correct – is indicated in the table below:

Kettle Valley Cost Estimate per CPCN Filed	**2005**	**2006**	**2007**	**2008**	**Total**
Kettle Valley Substation		8.74			**8.74**
Communication Link		2.66			**2.66**
Distribution Upgrade		2.91	3.1	2.55	**8.56**
Substation & Distribution Salvage			0.76	0.5	**1.26**
Land & ROW Easement Costs	0.16	0.04	0.03	0.03	**0.26**
	0.16	**14.35**	**3.89**	**3.08**	**21.48**

Kettle Valley CPCN Cost Estimate Adjusted by 2% CPI	**2005**	**2006**	**2007**	**2008**	**Total**
CPI Rates (per IR)	102.0%	102.0%	102.0%	102.0%	
Kettle Valley Substation	-	8.91	-	-	**8.91**
Communication Link	-	2.71	-	-	**2.71**
Distribution Upgrade	-	2.97	3.23	2.71	**8.90**
Substation & Distribution Salvage	-	-	0.79	0.53	**1.32**
Land & ROW Easement Costs	0.16	0.04	0.03	0.03	**0.26**
	0.16	**14.64**	**4.05**	**3.27**	**22.11**

3.0 Reference: Exhibit A2-13, BCUC 2.1, Attachment 2.1 b)

3.1 Please reconcile the $21.48 M and $28.39 M figures presented in Project Status Report No. 1 for the original and updated costs of the project with the $20.2 M and $27.2 M values referenced in the Capital Project Re-appropriation Request.

Response:

The $20.2 million and $27.2 million listed at the top of the Capital Project Re-appropriation Request represent capital addition costs only and not the salvage component. Further down in the Re-appropriation Request the salvage expenditures are listed with a net project budget of $21.48 million and a net project forecast of $28.39 million.

4.0 Reference: Exhibit B-10, BCUC 10.5.3 and 11.2

Exhibit 2-12, page 4

4.1 Does the final project cost of $28.67 M also include an allowance for AFUDC and, if so, how much is it?

Response:

Yes, the final project cost of $28.67 M also includes an allowance for AFUDC as shown in the Table below:

	2005	2006	2007	2008	2009	Total
	($000s)					
Kettle Valley Project Actual AFUDC	17	107	582	336	48	**1,090**

4.2 What is the amount of capitalized overhead included in the final project cost of $28.67 M?

Response:

The amount of capitalized overhead included in the final project cost is approximately $0.2 million.

5.0 Reference: Exhibit A2-16, page 2 of 10

Exhibit A2-12, page 1

5.1 How much of the $7.19 M increase over the initial (CPCN) cost is attributable to aspects of the project where the pricing was subject to competitive tender/open bidding and 2 or more eligible "bids" were received?

Response:

Please refer to BCPSO IR1 Attachment 5.1.

		$Millions			
Item	Expenditure	CPCN Approved Amount	Actual Spent Amount	Variance	Competitive Tender / Purchasing
	KV Substation				
1	2000A Breakers	0.04	0.06	0.02	Breakers competitively bid
2	Substation ground wells	0.00	0.04	0.04	Civil construction competitively bid
3	Line Work- Transmission Tap Complexity including Distribution Egress	0.19	0.37	0.18	Material for transmission competitively purchased
4	KV Substation Project Management & Supervision Costs	0.61	0.64	0.03	No competitive process
5	External construction management services	This item is the same as line 4			
6	"Addition Site Costs - schedule delays caused by the late transformer delivery	0.00	0.06	0.06	N/A
7	Protection and Control	0.47	0.54	0.07	Material and external labour competitively bid
8	KV Substation Engineering	1.13	1.96	0.83	No competitive process
9	Transformer	1.54	2.69	1.15	Transformers competitively bid
10	Impact of variable commodity clause	This item is the same as line 9			
11	Transformer Late Delivery and additional site costs	0.00	0.14	0.14	N/A
12	All Other	4.76	5.01	0.25	Material and external construction competitively bid
	Subtotal KV Substation	**8.74**	**11.51**	**2.77**	
	KV Distribution Upgrade				
13	Total Land/ROW	0.13	0.15	0.02	No competitive process
14	Land/ROW - Corridor 3		0.04	0.04	No competitive process
15	Land/ROW - Railway Grade Option	0.00	0.01	0.01	No competitive process
16	Using 9 Line/10 Line ROW	0.00	0.00	0.00	No competitive process
17	Materials	3.46	3.62	0.16	Material competitively purchased
18	Construction - Live Line Work and Labour Costs	3.62	5.00	1.38	Completed with internal resources
19	Oil Containment Costs	0.00	0.10	0.10	No competitive process
20	Copper Thefts	0.00	0.03	0.03	No competitive process
21	Copper Thefts - cost to repair and make damaged facilities safe	0.00	0.02	0.02	No competitive process
23	Project Management Cost	0.46	0.49	0.03	No competitive process
24	Engineering Costs	0.40	0.90	0.50	No competitive process
25	All Other	0.49	0.24	-0.25	N/A
	Subtotal KV Distribution Upgrade	**8.56**	**10.59**	**2.03**	
	High Capacity Communication				
26	Engineering	0.20	0.87	0.67	No competitive process
27	Materials	0.89	1.03	0.14	Materials competitively bid
28	Construction	1.50	2.11	0.61	Construction competitively bid
29	Project Management	0.07	0.16	0.09	Mainly completed with internal resources
	Subtotal High Capacity Communications	**2.66**	**4.18**	**1.52**	
30	**Salvage Cost**	**1.26**	**2.17**	**0.91**	Construction competitively bid
31	**Substation Land/ROW**	**0.26**	**0.22**	**-0.05**	No competitive process
CPCN Total		**21.48**	**28.67**	**7.18**	

5.2 Please identify those contributors to the $7.19 M increase where the costs were not the subject of competitive tender/open bidding.

Response:

Please refer to BCPSO IR1 Attachment 5.1.

6.0 Reference: Exhibit A2-12, page 4

6.1 If feasible, please break down the costs (both CPCN and actual) for the KV Substation using the same general cost categories and are used for the Distribution Upgrade and Communications (i.e., Materials, Construction, Engineering, Land, Project Management/Supervision, etc.)

Response:

FortisBC is unable to provide the estimated CPCN costs in the requested format as the station project was not estimated in these specific components. FortisBC does submit the following actual costs categorized in the requested format above.

Component	Spent ($millions)
Materials	4.51
Construction	4.35
Engineering	1.96
Project Management & Supervision	0.69
Overall Kettle Valley Substation Development Cost	**11.51**

6.2 If feasible, please break down the $7.19 M cost variance into the portions attributable to i) commodity/material price increases, ii) labour cost increases, iii) scope increases, iv) project delays and any other general factors considered by FortisBC to be material.

Response:

Please refer to BCPSO IR1 Attachment 6.2.

		$Millions			
Item	**Expenditure**	**CPCN Approved Amount**	**Actual Spent Amount**	**Variance ($ Millions)**	**Variance Classification**
	KV Substation				
1	2000A Breakers	0.04	0.06	0.02	Material increase
2	Substation ground wells	0.00	0.04	0.04	Scope refinement following detailed design
3	Line Work- Transmission Tap Complexity including Distribution Egress	0.19	0.37	0.18	Engineering optimization
4	KV Substation Project Management & Supervision Costs	0.61	0.64	0.03	Transformer delay and labour cost increases
5	External construction management services	This item is the same as line 4			
6	"Addition Site Costs - schedule delays caused by the late transformer delivery	0.00	0.06	0.06	Transformer delay
7	Protection and Control	0.47	0.54	0.07	Material and labour increases
8	KV Substation Engineering	1.13	1.96	0.83	Labour increases and project delays
9	Transformer	1.54	2.69	1.15	Commodity / material increases
10	Impact of variable commodity clause	This item is the same as line 9			
11	Transformer Late Delivery and additional site costs	0.00	0.14	0.14	Transformer delay
12	All Other	4.76	5.01	0.25	Material and labour increases
	Subtotal KV Substation	**8.74**	**11.51**	**2.77**	
	KV Distribution Upgrade				
13	Total Land/ROW	0.13	0.15	0.02	Actual incurred land costs
14	Land/ROW - Corridor 3		0.04	0.04	Permit rejection
15	Land/ROW - Railway Grade Option	0.00	0.01	0.01	Permit rejection
16	Using 9 Line/10 Line ROW	0.00	0.00	0.00	N/A
17	Materials	3.46	3.62	0.16	Commodity / material increases
18	Construction - Live Line Work and Labour Costs	3.62	5.00	1.38	Labour increases / scope complexity
19	Oil Containment Costs	0.00	0.10	0.10	Scope increase
20	Copper Thefts	0.00	0.03	0.03	Theft
21	Copper Thefts - cost to repair and make damaged facilities safe	0.00	0.02	0.02	Theft
23	Project Management Cost	0.46	0.49	0.03	Labour increases
24	Engineering Costs	0.40	0.90	0.50	Labour increases and permit rejection
25	All Other	0.49	0.24	-0.25	N/A
	Subtotal KV Distribution Upgrade	**8.56**	**10.59**	**2.03**	
	High Capacity Communication				
26	Engineering	0.20	0.87	0.67	Labour increases
27	Materials	0.89	1.03	0.14	Material increases
28	Construction	1.50	2.11	0.61	Labour increases
29	Project Management	0.07	0.16	0.09	Labour increases
	Subtotal High Capacity Communications	**2.66**	**4.18**	**1.52**	
30	**Salvage Cost**	**1.26**	**2.17**	**0.91**	Salvage complexity
31	**Substation Land/ROW**	**0.26**	**0.22**	**-0.05**	N/A
CPCN Total		**21.48**	**28.67**	**7.18**	

7.0 Reference: Exhibit A2-13, BCUC 9.6.2 and BCUC 21.1

7.1 The response to BCUC 9.6.2 describes the advantages of contracts with variable commodity clauses as opposed to fixed prices. BCUC 21.1 indicates that FortisBC used fixed price contracts to help control costs. For the Kettle Valley Project, please indicate where fixed price contracts (as opposed to variable pricing contracts) were used and why.

Response:

Fixed price labour contracts were used for the major construction components of the project, such as civil construction, electrical construction, line construction, salvage, and commissioning services. This type of contract was used because there was a complete engineering package on which to base the bids, there were construction and contract management services were in place to minimize extra costs, and it provided the project cost certainty at the best possible market price. For material purchases, fixed price contracts or purchase orders were used for all material purchases with the exception of the power transformers.

7.2 To what extent were the contracts that FortisBC issued for equipment & materials requiring metal commodities such as copper generally fixed price contracts versus contracts with variable commodity clauses?

Response:

Fixed price contracts were used for all material and equipment purchases on the project with the exception of the power transformer procurement. The bids for the power transformers presented FortisBC with an option to award the contract with a variable commodity clause or as a fixed price contract. The rationale behind the variable commodity pricing is to ensure the lowest possible base price while the alternative fixed price contract includes a commodity risk in the firm price to account for any potential market increases. The decision to use the award the contract with a variable commodity option resulted in an overall savings of $0.12 million as compared to the lowest fixed price bid.

8.0 Reference: Exhibit B-10, BCUC 4.1.2 & 4.1.3 and 4.2.2

8.1 Given that the recent escalation in commodity prices was documented prior to issuance of the Kettle Valley CPCN by the BCUC (and even prior to FortisBC submitting its Reply in the CPCN Application review), please explain more fully why there was no concern regarding the potential impact of the Project's costs that would warrant raising the issue with the Commission.

Response:

At the time that the Commission Panel was considering the Kettle Valley Project CPCN, FortisBC began to see initial indications of potential cost escalations in some areas of the project. At the time, it was felt that that these potential cost increases could be either mitigated or accommodated within the project contingencies. On that basis, FortisBC did not consider it necessary to advise the Commission Panel at that time as it did not appear that the overall project cost would be impacted. Indeed, the words "inflation" and "escalation" are not found in any Kettle Valley CPCN information requests, argument, or decision; clearly neither the intervenors nor the Commission, like FortisBC, considered the potential for commodity escalation to be a significant concern or project risk.

Further, following the development of the project estimate for the CPCN in September 2005, no new information in terms of firm or actual costs was available until after the project was approved and firm contract bids were received in early 2007. At that time the project was able to be meaningfully re-estimated based on updated pricing information. Only following the development of the revised estimate, did the magnitude of the cost escalation compared to the original estimate become clear and hence FortisBC met with the Commission to raise the issue regarding the new project forecast in June 2007.

9.0 Reference: Exhibit B-10, BCUC 13.9

9.1 If labour inflation had been 3% per annum and the inflation for all other costs had been 2% per annum how would this have impacted the final cost of the project – assuming the initial cost estimate was correct in all other regards and there was no other use required for the contingency allowance of $0.79 M.

Response:

If labour inflation had been 3% per annum and the inflation for all other costs had been 2% per annum, the final cost of the project (assuming the initial cost estimate was correct in all other

regards and there was no other use required for the contingency allowance of $0.79 million), would have been $22.3 million, as indicated in Table-3 below:.

Table-1 (as filed in the CPCN – Refer CPCN – Pg 25):

Kettle Valley Project Estimated Cost (Refer: CPCN-Pg 25)	2005	2006	2007	2008	Total
Kettle Valley Substation	0.00	8.74	0.00	0.00	8.74
Kettle Valley Communication Link	0.00	2.66	0.00	0.00	2.66
Kettle Valley Distribution Upgrade	0.00	2.91	3.10	2.55	8.56
Kettle Valley Salvage	0.00	0.00	0.76	0.50	1.26
Kettle Valley Land & ROW Easement	0.16	0.04	0.03	0.03	0.26
TOTAL:	**0.16**	**14.35**	**3.89**	**3.08**	**21.48**

Table-2 (Split into Labour & Material / Other Components: Refer CPCN Appendix-D – Pgs 2 - 4):

Kettle Valley Project Estimated Cost Split into Labour & Material / Other	2005		2006		2007		2008		Total	
(Refer: CPCN-Appendix-D Pgs-2 to 4)	Labour	Material / Other	Labour	Material / Other	Labour	Material / Other	Labour	Material / Other	Labour	Material / Other
Kettle Valley Substation	-	-	4.31	4.43	-	-	-	-	4.31	4.43
Kettle Valley Communication Link	-	-	1.77	0.89	-	-	-	-	1.77	0.89
Kettle Valley Distribution Upgrade	-	-	1.73	1.18	1.85	1.25	1.52	1.03	5.10	3.46
Kettle Valley Salvage	-	-	-	-	0.76	-	0.50	-	1.26	-
Kettle Valley Land & ROW Easement	-	0.16	-	0.04	-	0.03	-	0.03	-	0.26
TOTAL:	**-**	**0.16**	**7.81**	**6.54**	**2.61**	**1.28**	**2.02**	**1.06**	**12.44**	**9.04**
									21.48	

Table-3 (Final Cost Estimate after application of Inflation rates per the above IR):

Kettle Valley Project Estimated Cost after Inflation Adjustment (per IR)	2005		2006		2007		2008		Total	
	Labour	Material / Other	Labour	Material / Other	Labour	Material / Other	Labour	Material / Other	Labour	Material / Other
Year Sequence (Base Year - 2005) Labour Inflation Rate Applied Material Inflation Rate Applied			1 103%	1 102%	2 103%	2 102%	3 103%	3 102%		
Kettle Valley Substation	-	-	4.44	4.52	-	-	-	-	4.44	4.52
Kettle Valley Communication Link	-	-	1.82	0.91	-	-	-	-	1.82	0.91
Kettle Valley Distribution Upgrade	-	-	1.79	1.20	1.96	1.30	1.66	1.09	5.41	3.60
Kettle Valley Salvage	-	-	-	-	0.81	-	0.55	-	1.35	-
Kettle Valley Land & ROW Easement	-	0.16	-	0.04	-	0.03	-	0.03	-	0.26
TOTAL:	**-**	**0.16**	**8.05**	**6.67**	**2.77**	**1.33**	**2.21**	**1.13**	**13.02**	**9.29**
									22.31	

10.0 Reference: Exhibit B-10, BCUC 21.5

10.1 Please provide a schedule that breaks down the Project's original cost estimate ($21.48 M) as between direct project costs, allowances for capitalized overheads, AFUDC, contingency and salvage.

Response:

Please see the table below.

	$millions
Direct Project Costs	16.19
Allowances for Capitalized OH	1.33
AFUDC	1.17
Contingency	1.53
Salvage	1.26
Total	21.48

10.2 Was a break down of the costs from this perspective provided during the consideration of the CPCN Application? If yes, please provide the reference.

Response:

Only the project salvage and AFUDC were explicitly identified in the CPCN filing. Please refer to page 25, line 4 from the Kettle Valley CPCN Application for detail on project salvage costs, and page 5, Appendix E to the Application for AFUDC. The project estimates included overheads and contingency.

10.3 Please provide a similar breakdown for the final project costs ($28.67 M).

Response:

The requested information has been provided below:

Kettle Valley Actual Expenditure Breakdown	2005	2006	2007	2008	2009	2010	Total
				$millions			
Kettle Valley Project Unloaded Expenditure	0.85	1.57	17.57	4.69	0.42	-	**25.10**
Kettle Valley Project Salvage	-	-	0.02	0.81	0.18	1.17	**2.17**
Kettle Valley Project Capitalized Overhead	0.04	0.16	0.06	(0.06)	-	-	**0.20**
Kettle Valley Project Direct Overhead	0.04	0.06	0.16	(0.16)	-	-	**0.11**
Kettle Valley Project AFUDC	0.02	0.11	0.58	0.34	0.05	-	**1.09**
Kettle Valley Actiual Expenditure	**0.95**	**1.90**	**18.40**	**5.62**	**0.65**	**1.17**	**28.67**

11.0 Reference: Exhibit B-10, BCUC 28.4

11.1 Please provide a schedule similar to that provided in the response to BCUC 28.4 that sets out the cost by resource code per the CPCN Application (i.e, in 2005$) based on the original completion schedule. In doing so, please show the contingency allowance separately.

Response:

FortisBC is unable to provide the requested schedule as the Company does not have more detailed estimates by resource code.

12.0 Reference: Exhibit B-10, BCUC 11.2 and BCUC 29.4.1 & 30.1.1

12.1 Please show the derivation of the $0.79 M contingency allowance included in the CPCN cost estimate and, in particular, the project costs to which the 10% allowance was applied.

Response:

FortisBC incorrectly stated the total project contingency amount of $0.79 million in Exhibit B-10, BCUC IR1 Q11.2. In fact, the contingency calculated on the substation, voltage conversion and communication components of the project totaled $1.53 million. Please refer to Exhibit B-10, BCUC IR1 Q28.2 for a breakdown of the project contingency by component. The contingency was derived by taking the 10% of the total project cost less AFUDC, PST and corporate overheads.

13.0 Reference: Exhibit B-10, BCUC 36.2.3

13.1 The response states "Indeed, given the level of visibility provided by FortisBC to the Commission regarding the Project and the cost escalation pressures on the Project budget…". Please provide references to the initial CPCN proceeding that demonstrate the Commission would have been aware of the "cost escalation pressures" facing the Project.

Response:

For clarity, the reference to the "level of visibility provided by FortisBC to the Commission regarding the Project and the cost escalation pressures on the Project budget" was provided in regards to the following submissions (all made subsequent to CPCN approval):

- Information detailing the cost escalation pressures provided as part of the revised project expenditure estimate submitted at the June 2007 meeting between the Company and the Commission;

- Detailed project progress information including the estimates to completion reflecting the impact of the cost escalation pressures provided by way of the thirteen quarterly progress reports submitted to the Commission during construction of the Project; and

- The actual and forecast expenditures reflecting the cost escalation pressures for the Project provided as part of FortisBC's annual Revenue Requirements applications as well as the relevant Capital Expenditure Plan applications.

Indeed, given the provision of this information regarding the cost escalation pressures facing the Project in the submissions identified above, the Company believes the Commission had adequate opportunity to direct FortisBC to file a revised CPCN had it determined it necessary to do so.

1. Total amount approved by BCUC for the Kettle Valley upgrade

Response:

The Kettle Valley Project CPCN application was approved at a capital cost of $21.48 million including the cost of removal.

2. Total amount expended by Fortis to date.

Response:

Total project expenditures incurred to date are $28.67 million including the cost of removal.

3. Are any further funds required to complete the upgrade.

Response:

No further funds are required to complete the Kettle Valley Project. The project was completed in December 2010.

4. State the number of Fortis customer power meters that were in the new substation service area in years 1995, 2000, 2005 and 2010. Has the service area changed? If so please provide details showing why, when and by how much.

Response:

The data provided below is based on the meter reading routes. The meter reading routes and feeder configurations have changed over the years, so the numbers provided below are approximate.

Year	Customer Meters
1995	1,791
2000	2,798
2005	3,124
2010	3,309

5. State maximum peak demand in the service area in each of 1995, 2000, 2005 and 2010.

Response:

Please see the table below. Note, FortisBC is unable to provide the peak demand for the service area previous to 2001 as this information is not available.

Year	Peak Demand
2001	13,407 kVA
2005	14,340 kVA
2010	11,050 kVA

6. What was the maximum demand the old substation was capable of handling.

Response:

The transformers at the legacy substations had the following rated capacities:

Station/Transformer	Rated Capacity
Midway T1	13.3 MVA
Rock Creek T1	4.5 MVA
Rock Creek T2	2 MVA
Greenwood	3 MVA

7. What percentage of the new substation's maximum design capacity was required to meet peak downstream power demand in each month in the years 2011 and 2012.

Response:

The maximum design capacity for the Kettle Valley substation is 40 MVA, which is equivalent to the maximum nameplate rating of one of the transformers. The second Kettle Valley transformer was installed for reliability (as FortisBC does not have a mobile transformer with a 161kV transmission tap) and thus does not contribute to the overall design capacity. FortisBC

also notes that the customer load dropped in 2007 by approximately 5 MVA with the unexpected closure of the local mill. The percentage of the substations capacity required to meet the demand for each month in 2011 and 2012 is provided below:

Month	% Peak Demand
Jan-11	26.0
Feb-11	27.5
Mar-11	22.3
Apr-11	17.5
May-11	15.5
Jun-11	13.3
Jul-11	15.0
Aug-11	15.0
Sep-11	15.0
Oct-11	19.5
Nov-11	23.0
Dec-11	25.0
Jan-12	30.0
Feb-12	28.0
Mar-12	25.0
Apr-12	23.0
May-12	20.0
Jun-12	18.0
Jul-12	17.0

8. What percentage of the new substation's maximum design capacity was required to meet average hourly downstream power demand in each month in the years 2011 and 2012 for the first business day of each month. Graph answer on a 24 hour clock.

Response:

Please refer to Gabana IR1 Appendix 8.

9. Provide original budget amounts for the largest 15 line items originality submitted to BCUC for the project under review.

1 **Response:**

2 Please refer to Gabana IR1 Attachment 9.

	Top 15 Line items	BCUC Budget	Total Expended
		$ millions	
1	KV Substation - STATION EQUIPMENT & APPARATUS & STRUCTURES & BUS WORK	**4.51**	**5.89**
2	KV Distribution Upgrade - CONSTRUCTION	**3.62**	**5.10**
3	KV Distribution Upgrade - MATERIALS	**3.46**	**3.62**
4	KV High Capacity Communication - CONSTRUCTION	**1.5**	**2.11**
5	KV Substation - CIVIL & SITE & BUILDINGS	**1.4**	**1.50**
6	Line and Substation Salvage	**1.26**	**2.17**
7	KV Substation - ENGINEERING	**1.13**	**1.96**
8	KV High Capacity Communication - MATERIALS	**0.89**	**1.03**
9	KV Substation - PROJECT MANAGEMENT & SUPERVISION	**0.61**	**0.70**
10	KV Distrbution Upgrade - OTHER CONTRACT (Telus)	**0.49**	**0.29**
11	KV Substation - PROTECTION & CONTROL AND METERING	**0.47**	**0.54**
12	KV Distribution Upgrade - PROJECT MANAGEMENT & SUPERVISION	**0.46**	**0.49**
13	KV Distribution Upgrade - ENGINEERING	**0.4**	**0.90**
14	Substation Land / ROW / Easement Issues	**0.26**	**0.22**
15	KV Substation - COMMISSIONING	**0.25**	**0.28**

10. What proportion of the project's revised budget and the project's actual expenditures were completed in house versus contracted out.

Response:

FortisBC estimates that approximately 80.5 percent of all labour and services for the project were sourced externally as compared to 19.5 percent of internal labour effort.

11. Provide total amount expended on the above 15 line items.

Response:

Please refer to Gabana IR1 Attachment 9 above.

12. Show revenue or cost recovery to Fortis from the above 15 expenditures.

Response:

Please see the table below detailing the total annual revenue requirement related to the Kettle Valley Project.

Total Annual Revenue Requirement Associated with Kettle Valley CPCN

	2007	2008	2009	2010	2011
	($000s)				
Depreciation	0	277	842	898	898
Cost of Debt	9	715	1,010	1,019	967
Cost of Equity	8	667	898	1,050	1,038
Taxes	(137)	(153)	(119)	(8)	34
Total Annual Revenue Requirement	**(120)**	**1,506**	**2,631**	**2,959**	**2,937**

The fifteen largest project expenditures detailed in the response to Gabana IR1 Q9 represent approximately 94 percent of the total project expenditures. Therefore, the total annual revenue requirement related to these 15 project expenditures is as follows:

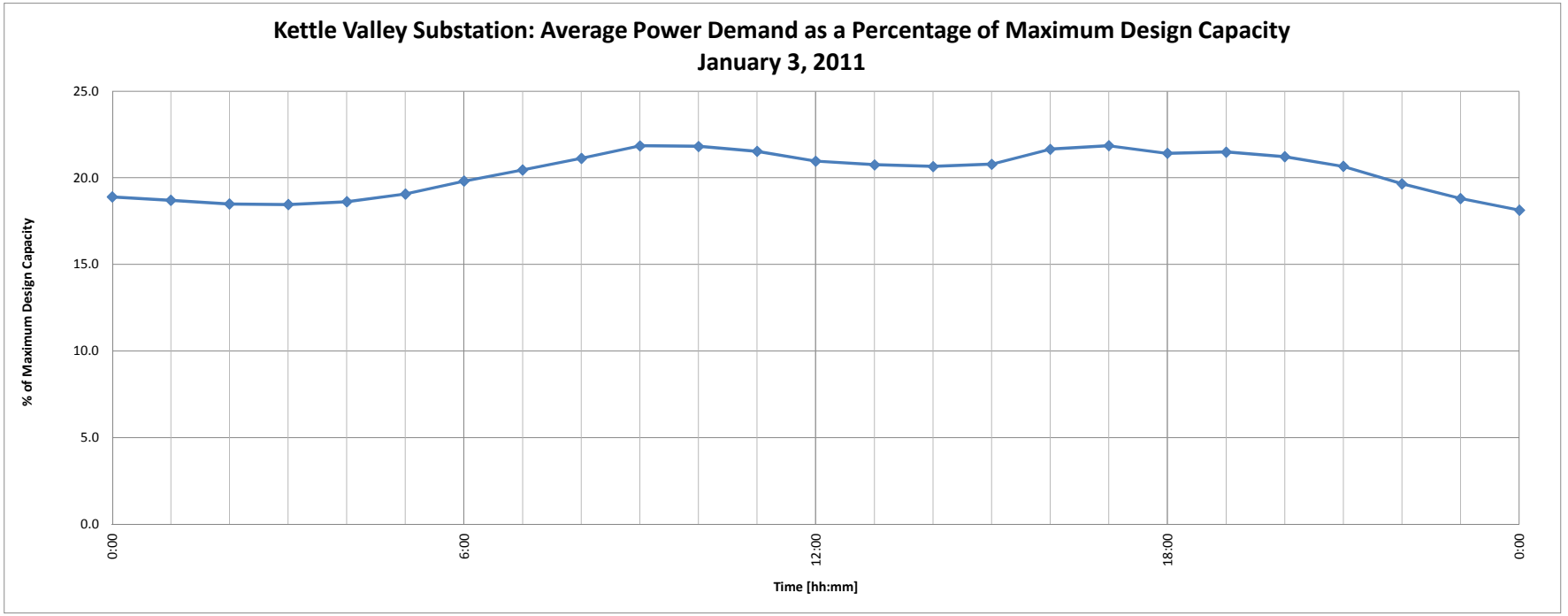
Total Annual Revenue Requirement Associated with Kettle Valley CPCN (Top 15)

	2007	2008	2009	2010	2011
	($000s)				
Total Annual Revenue Requirement (Top 15 Items)	(113)	1,416	2,473	2,781	2,761

13. How were the above revenues and/or cost recoveries reported in the Fortis's financial statements.

Response:

The revenues were reported as electricity revenue, and the costs were reported as depreciation and amortization expense, finance charges, taxes, and net earnings.


Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
January 3, 2011
% of Maximum Design Capacity
25.0
20.0
15.0
10.0
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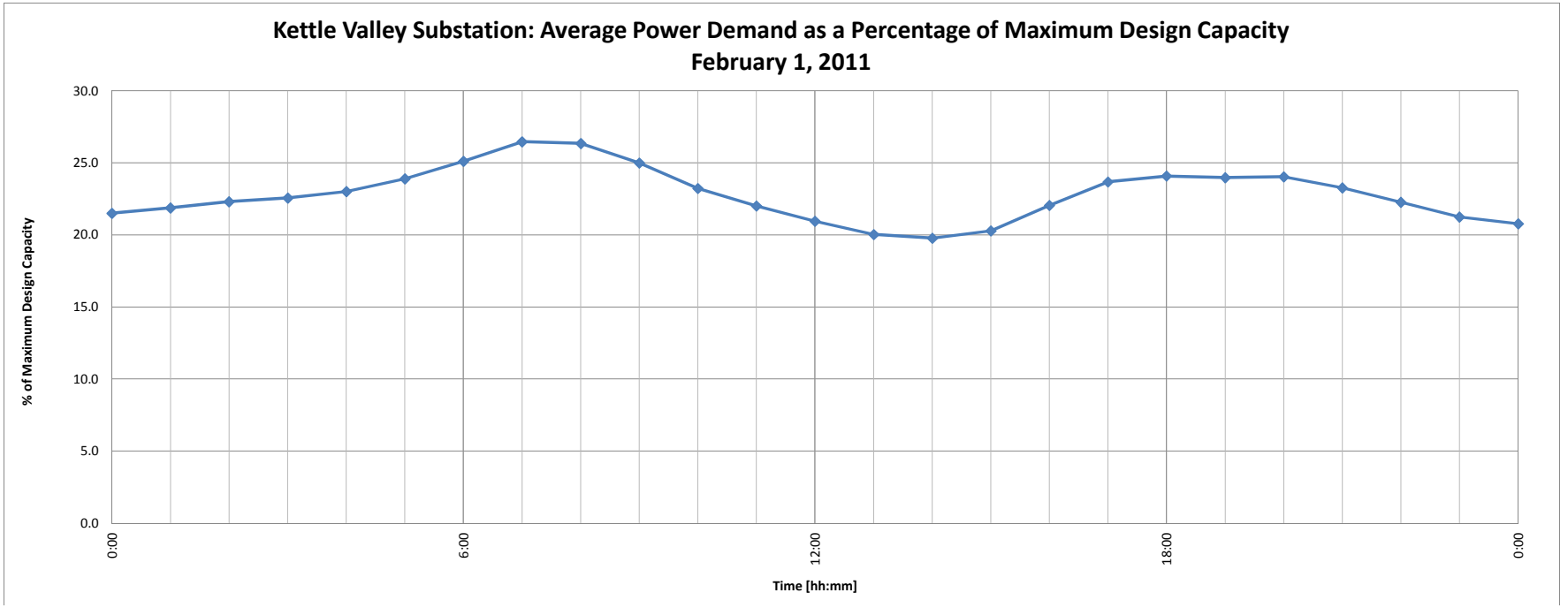
Time [hh:mm]


Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
February 1, 2011
% of Maximum Design Capacity
30.0
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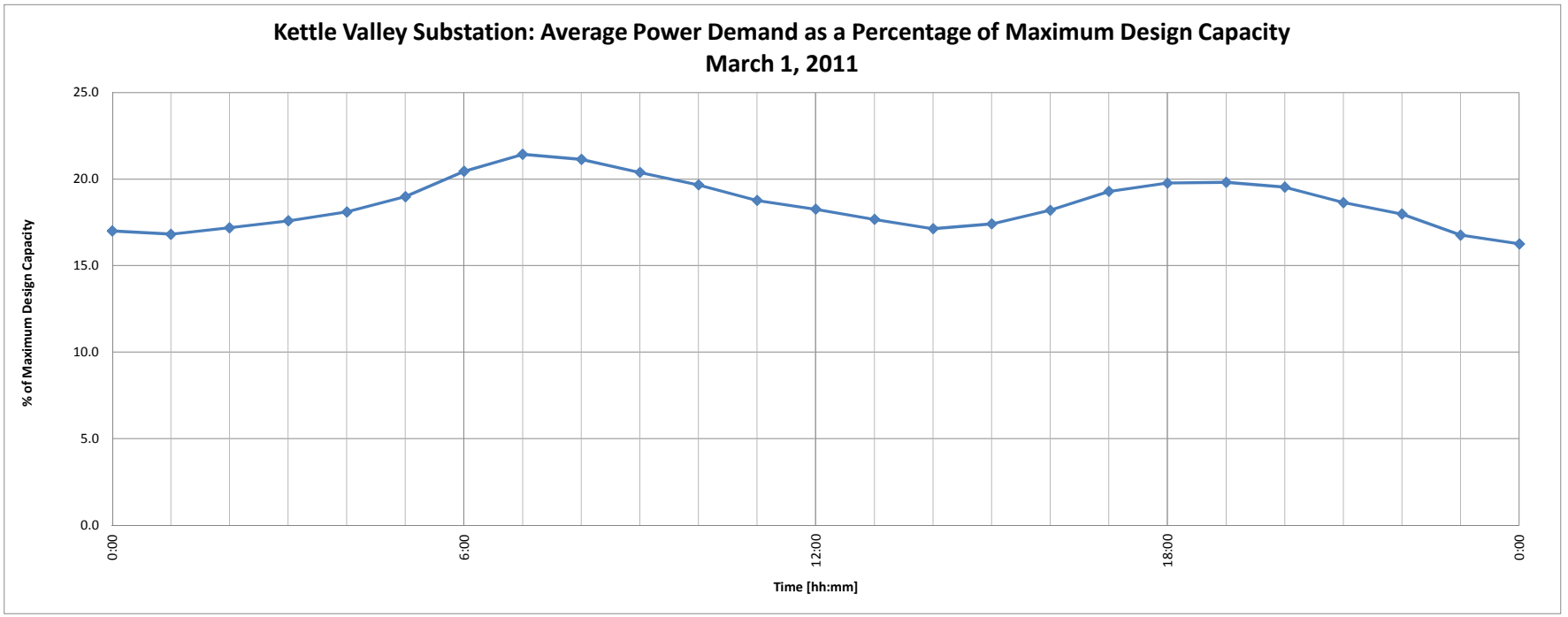
Time [hh:mm]


Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
March 1, 2011
% of Maximum Design Capacity
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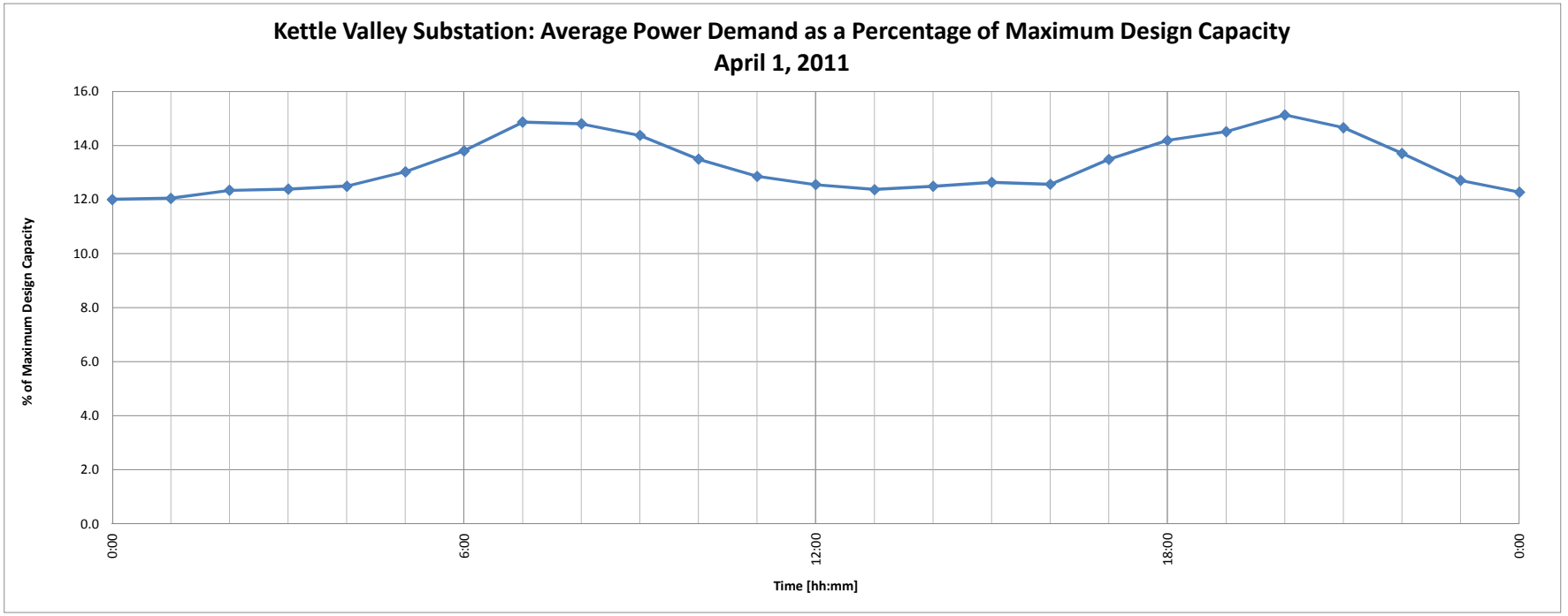
Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
April 1, 2011
% of Maximum Design Capacity
16.0
14.0
12.0
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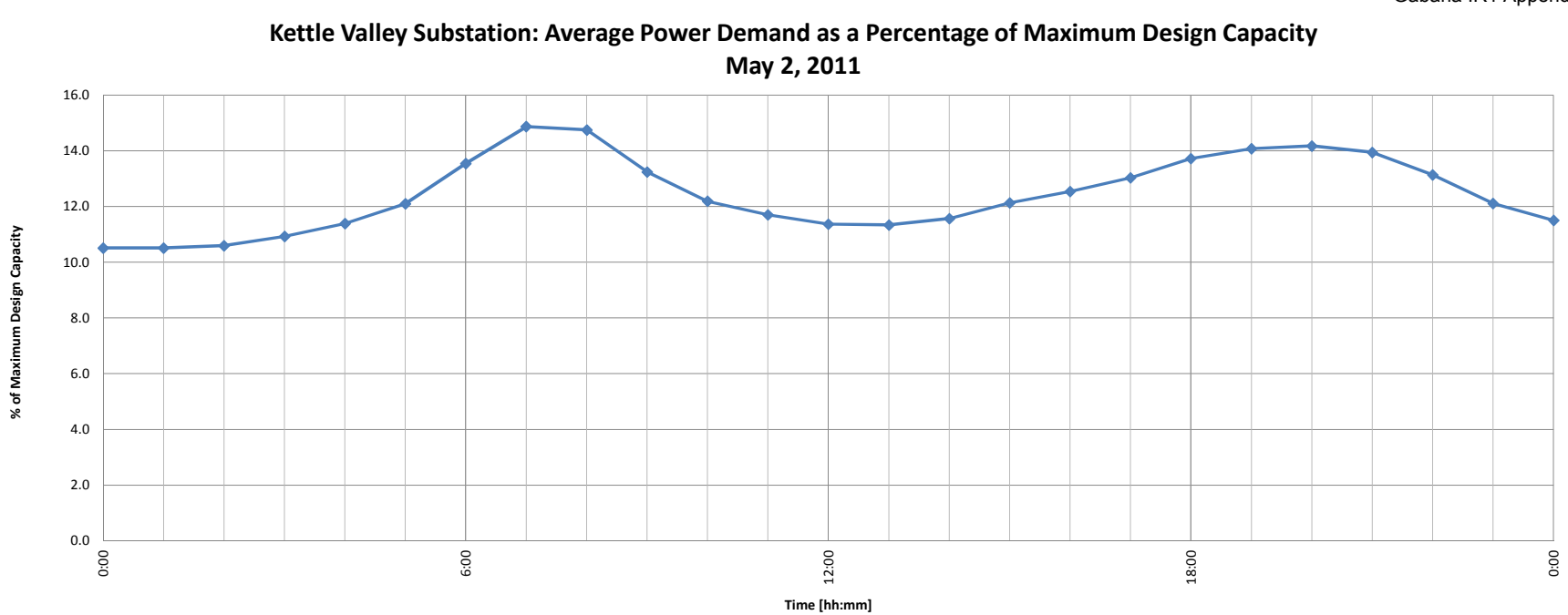
Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
May 2, 2011
% of Maximum Design Capacity
16.0
14.0
12.0
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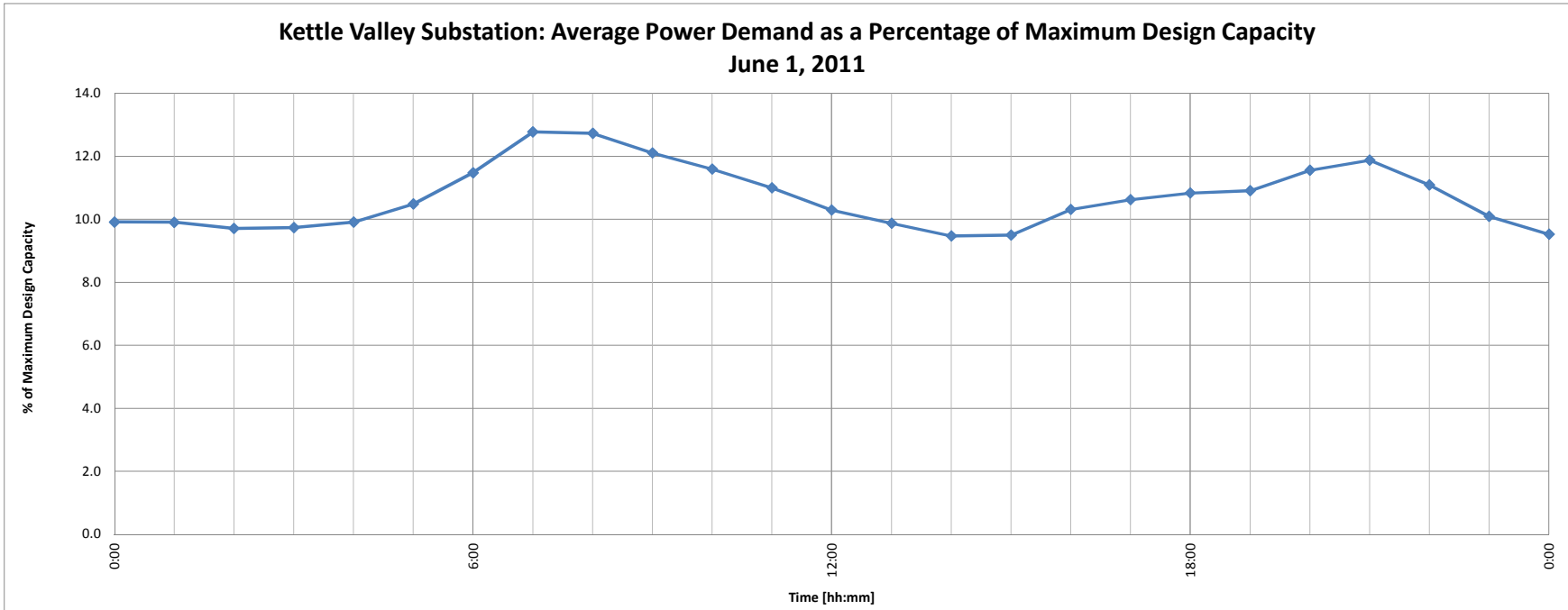
Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
June 1, 2011
% of Maximum Design Capacity
14.0
12.0
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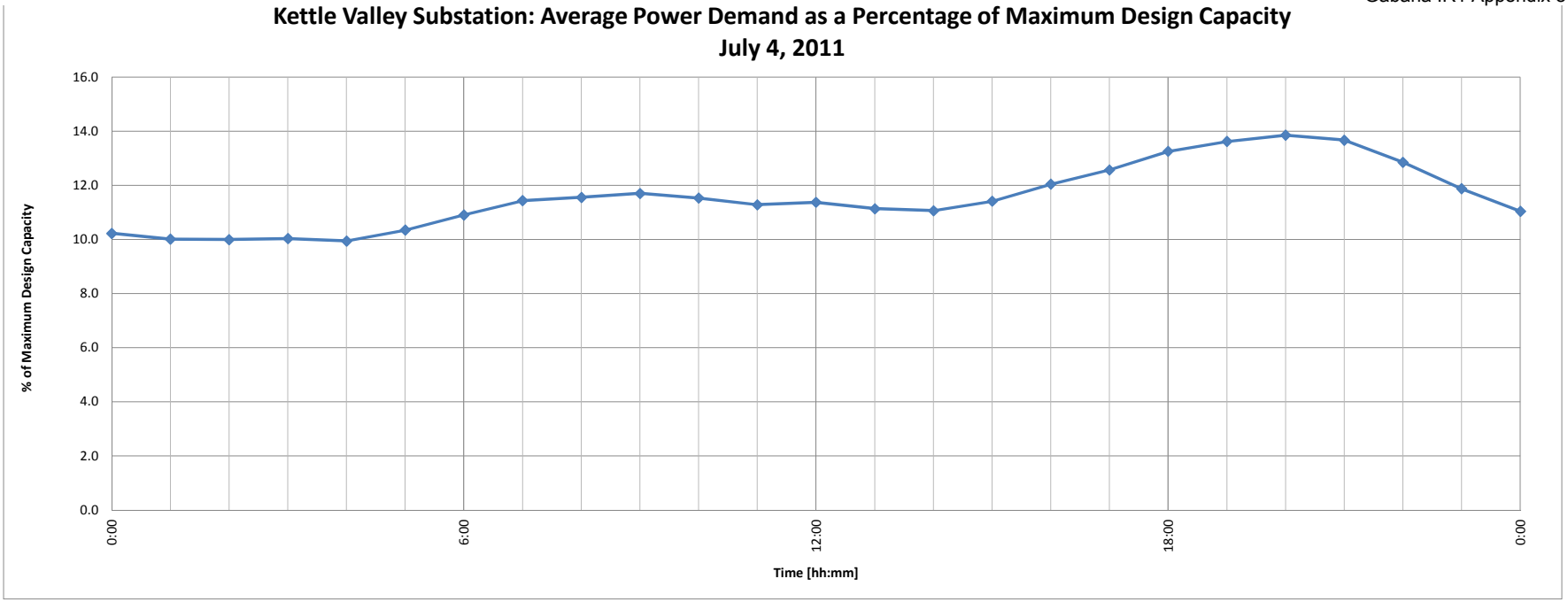
Time [hh:mm]


Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
July 4, 2011
% of Maximum Design Capacity
16.0
14.0
12.0
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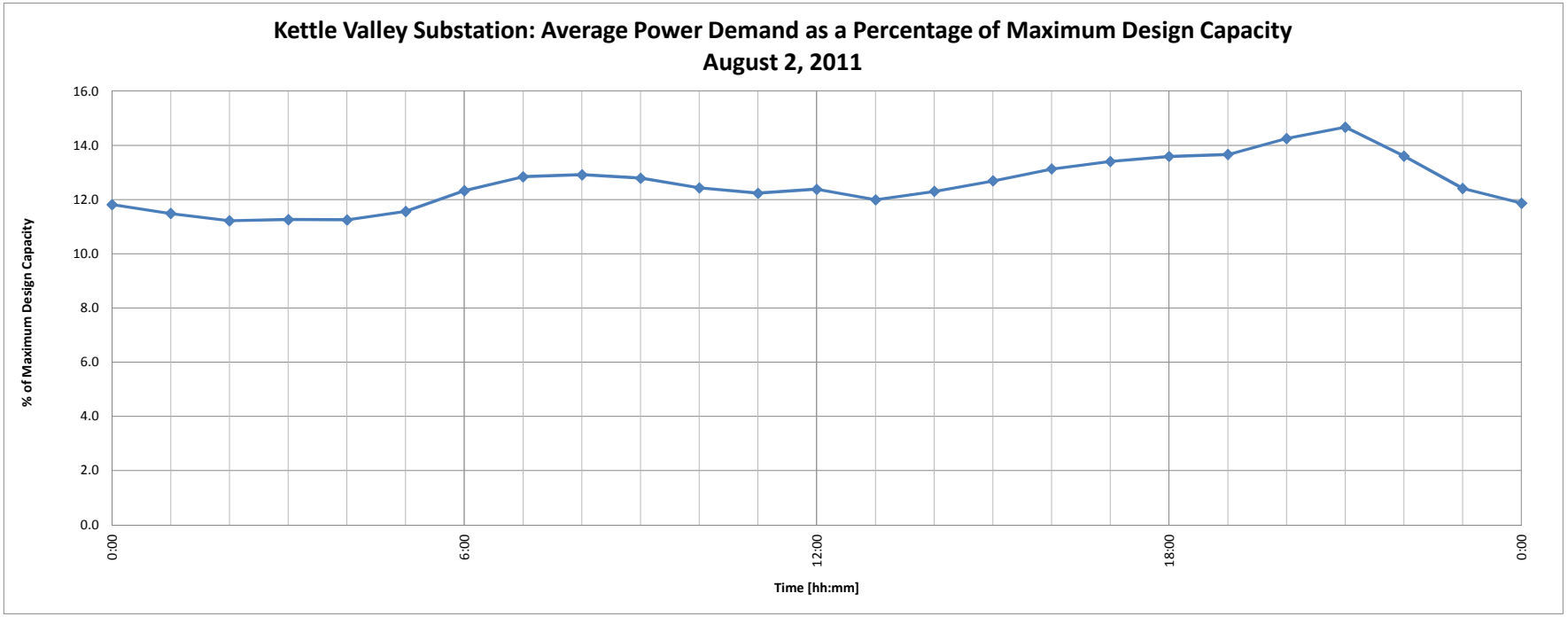
Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
August 2, 2011
% of Maximum Design Capacity
16.0
14.0
12.0
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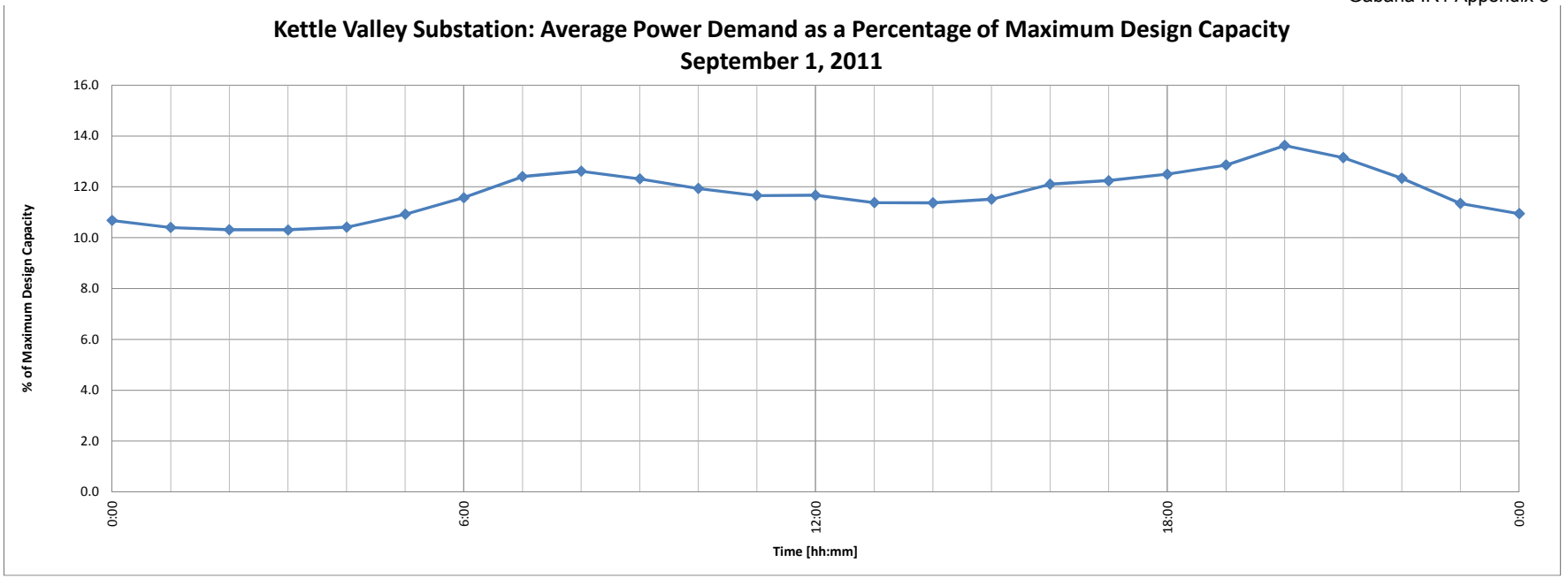
Time [hh:mm]


Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
September 1, 2011
% of Maximum Design Capacity
16.0
14.0
12.0
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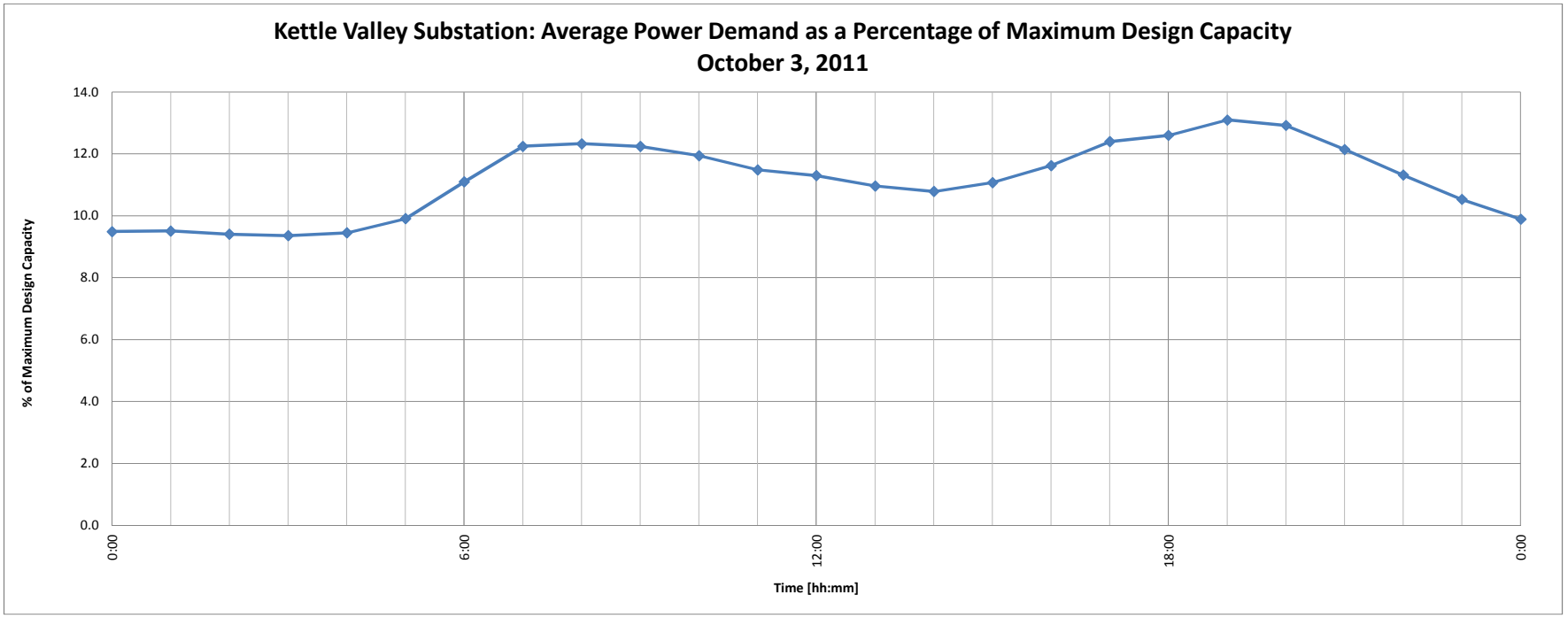
Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
October 3, 2011
% of Maximum Design Capacity
14.0
12.0
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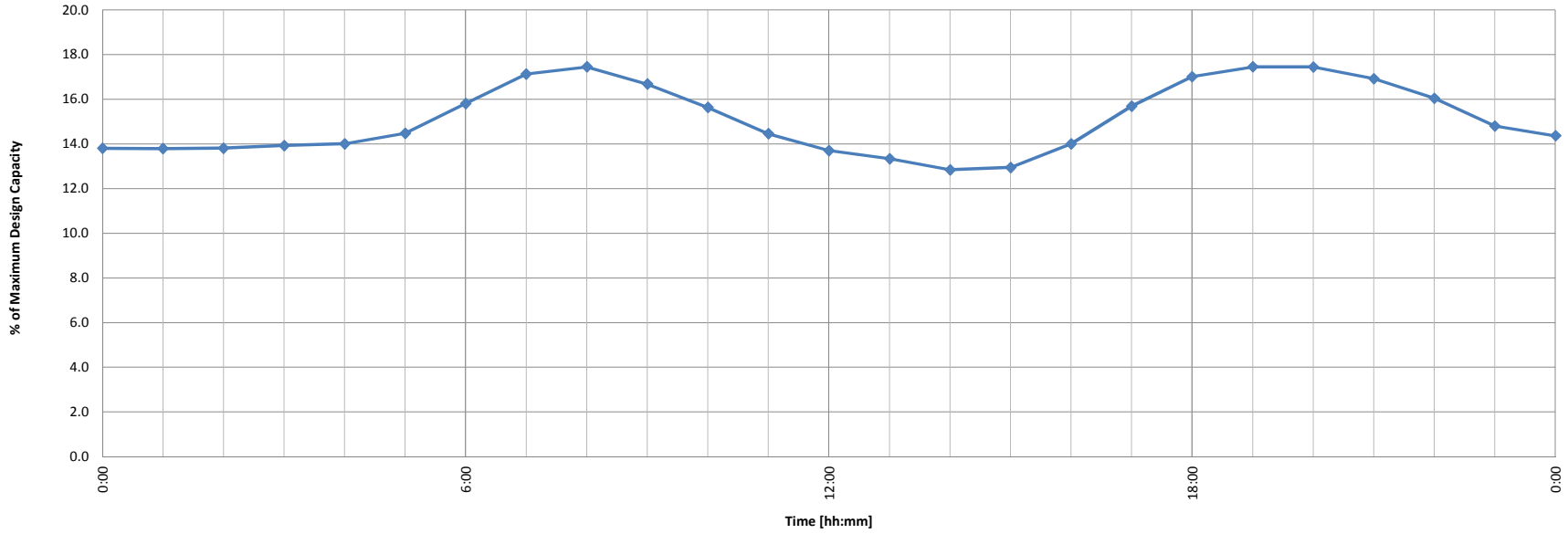
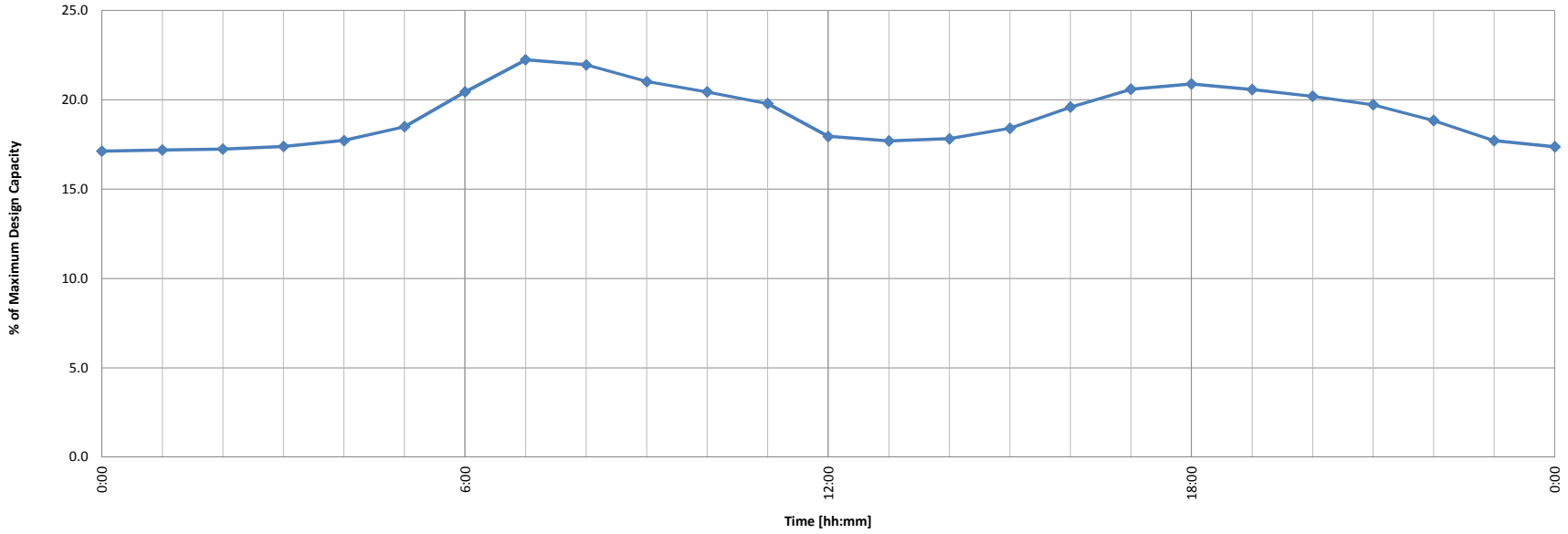
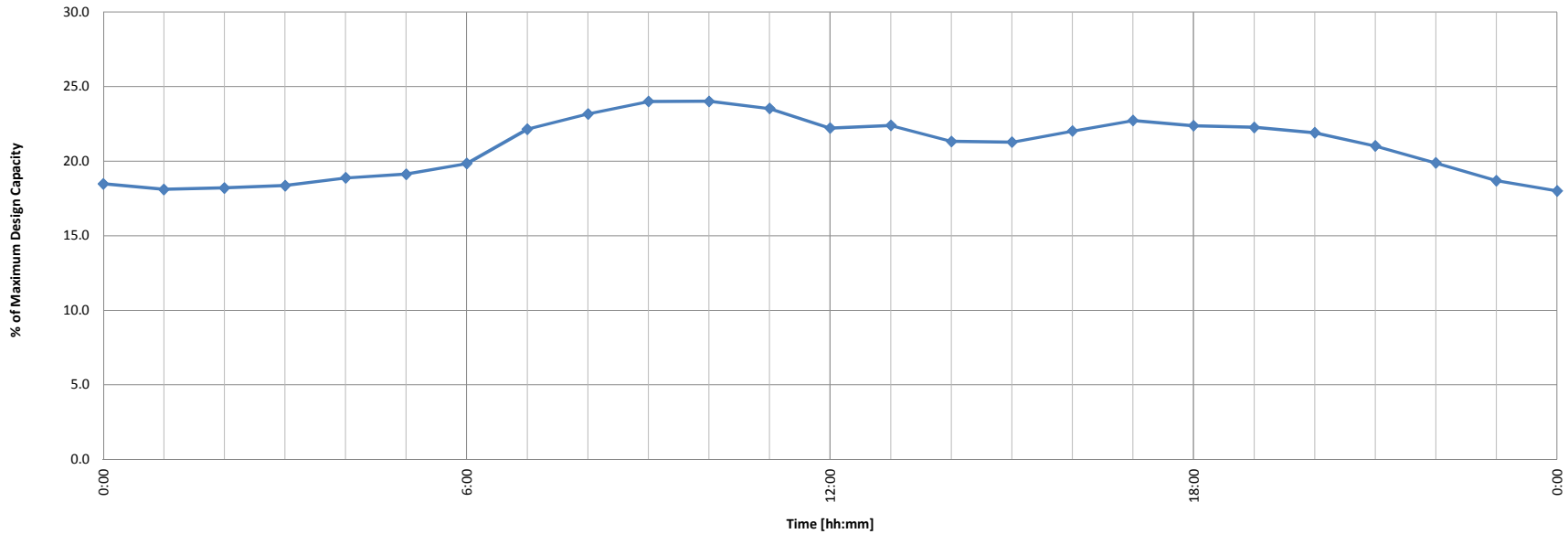
Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
November 1, 2011



Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
December 1, 2011




Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
January 2, 2012
% of Maximum Design Capacity
30.0
25.0
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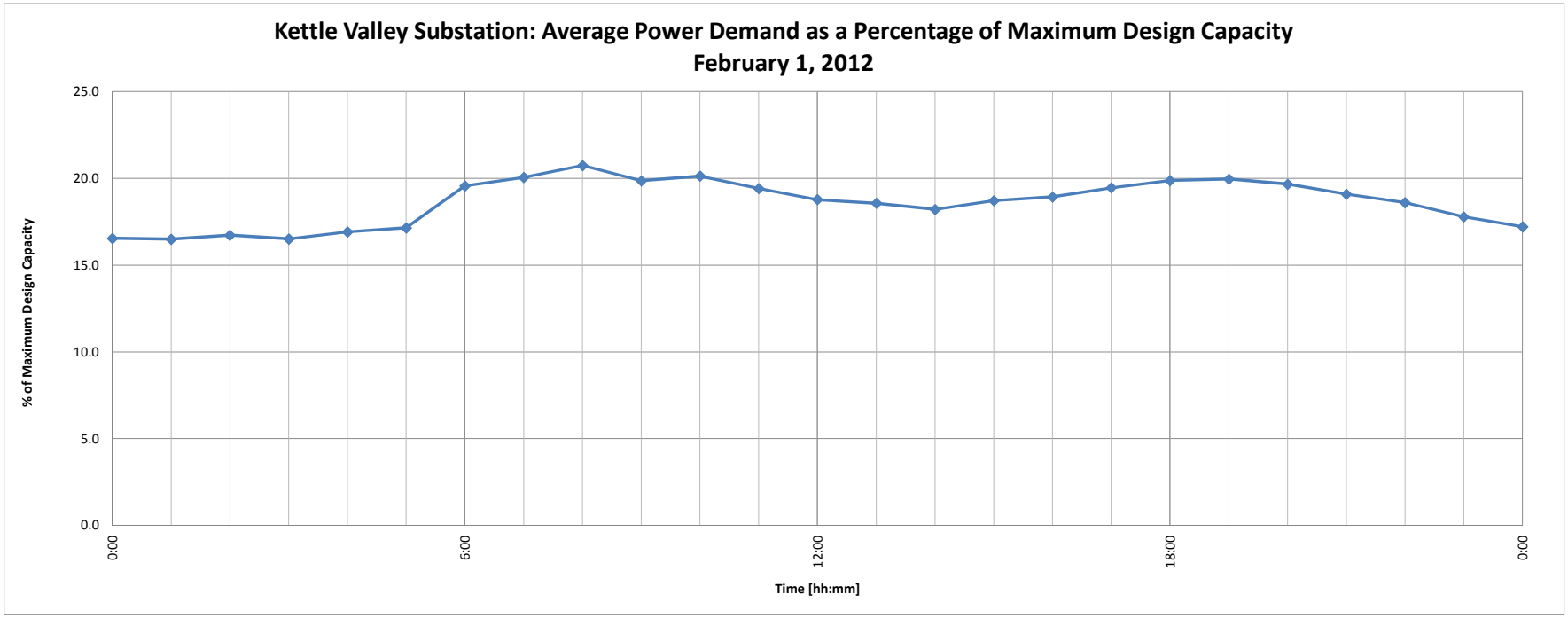
Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
February 1, 2012
% of Maximum Design Capacity
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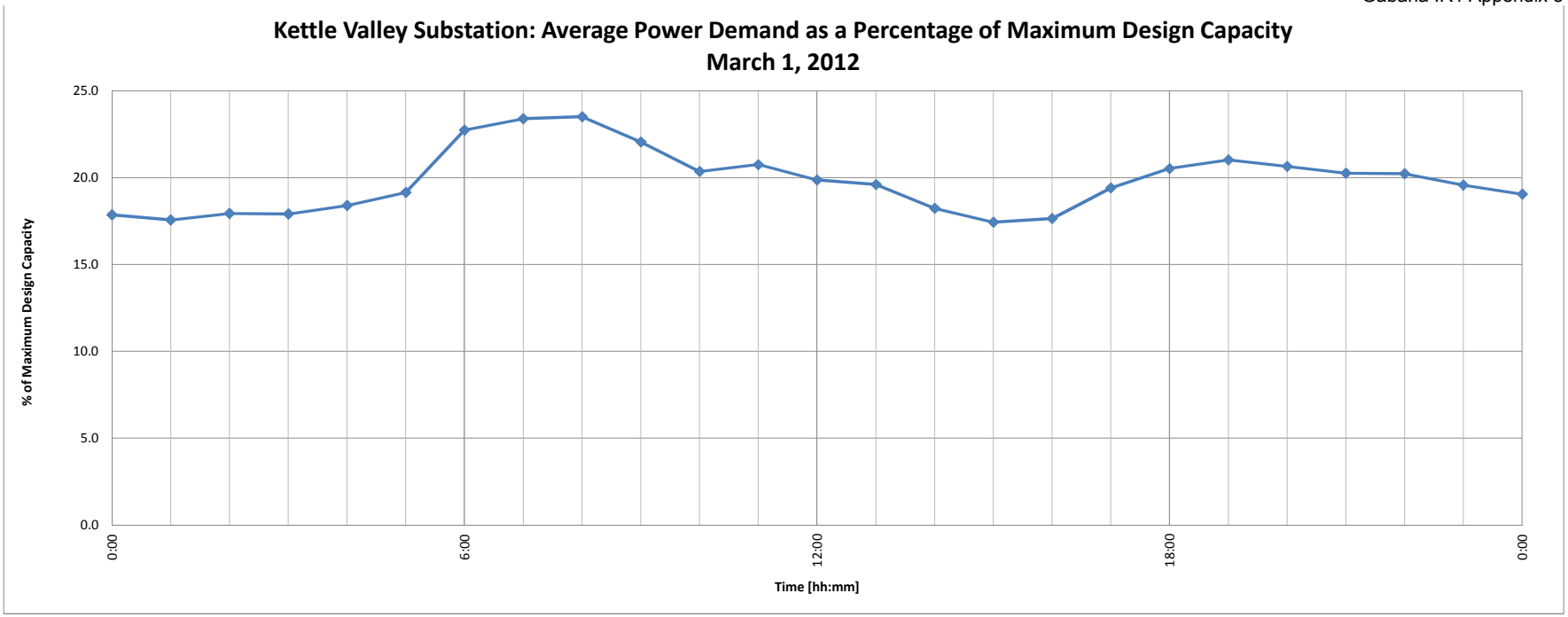
Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
March 1, 2012
% of Maximum Design Capacity
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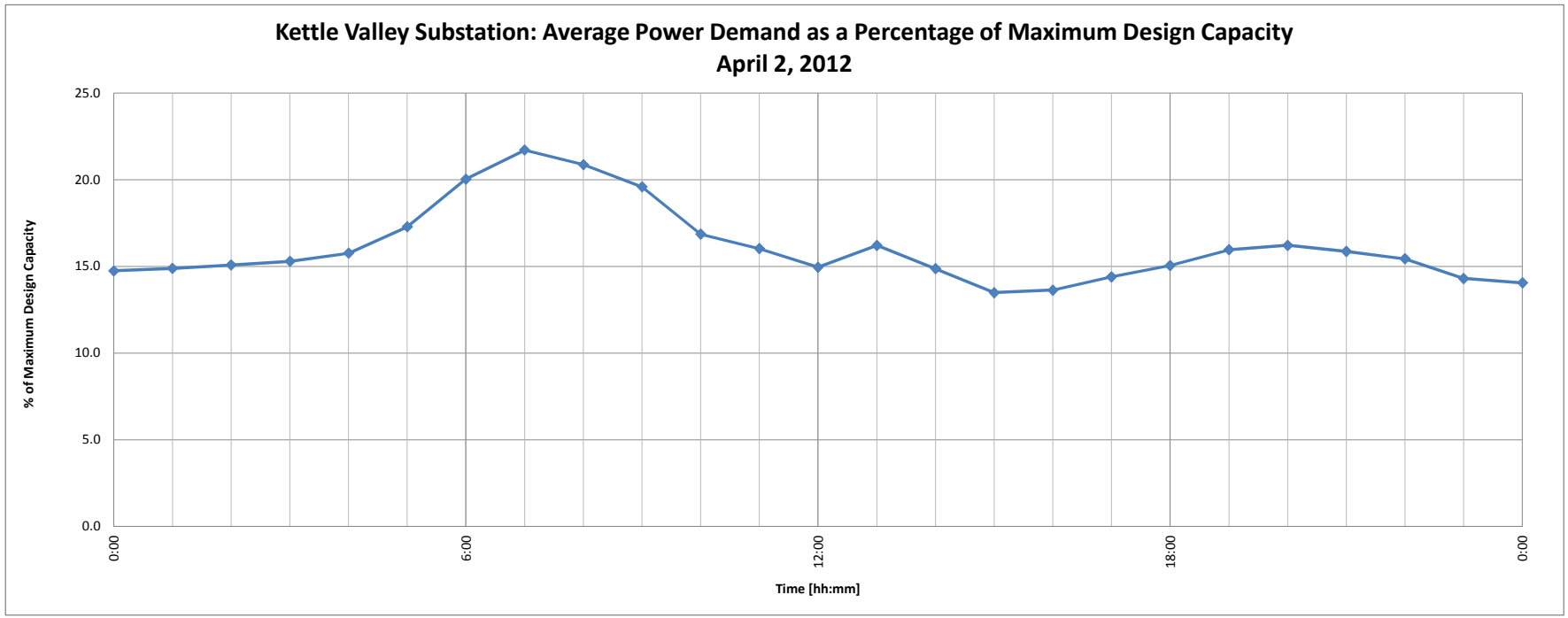
Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
April 2, 2012
% of Maximum Design Capacity
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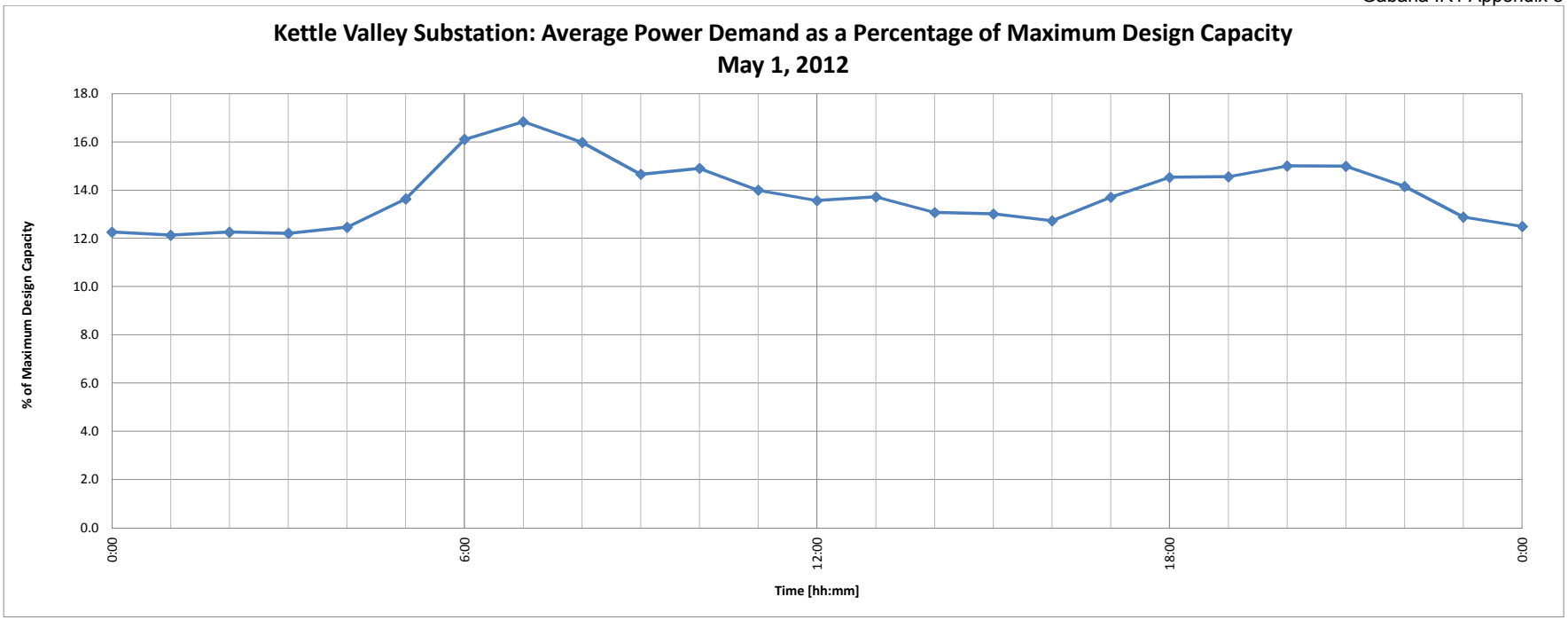
Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
May 1, 2012
% of Maximum Design Capacity
18.0
16.0
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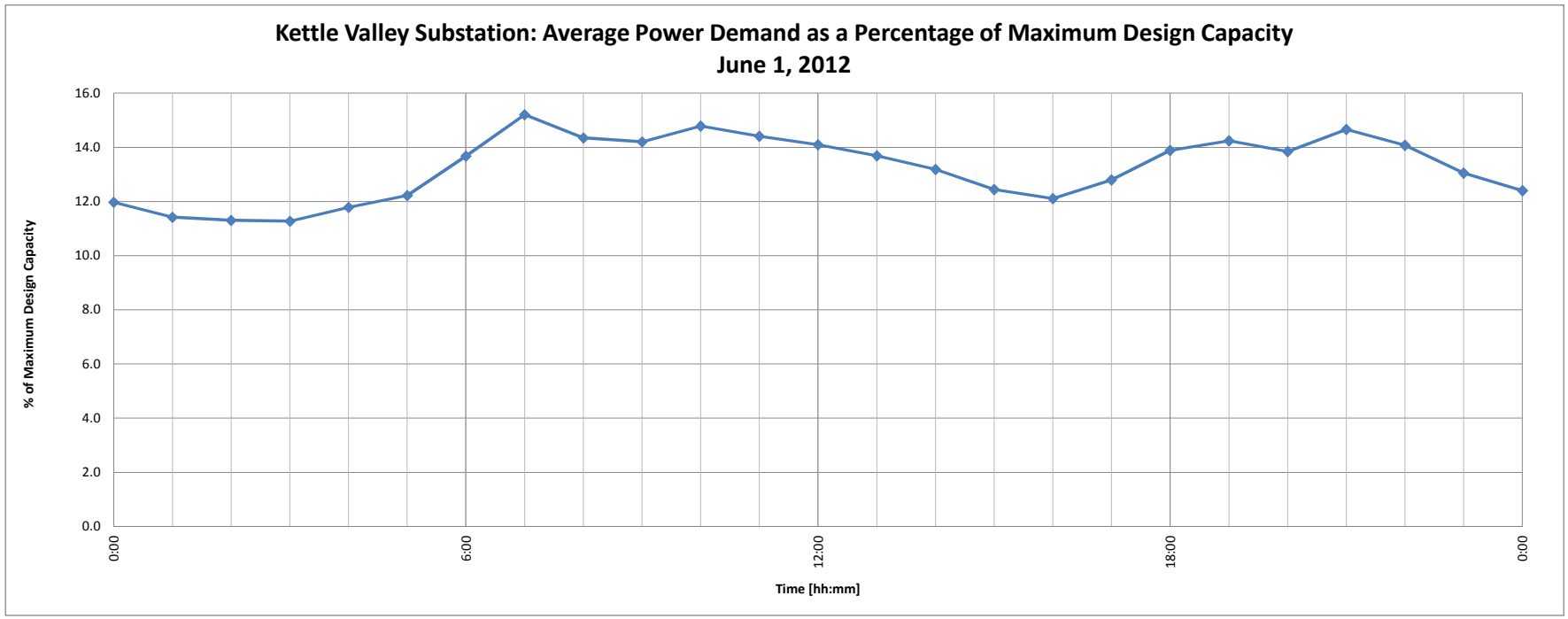
Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
June 1, 2012
% of Maximum Design Capacity
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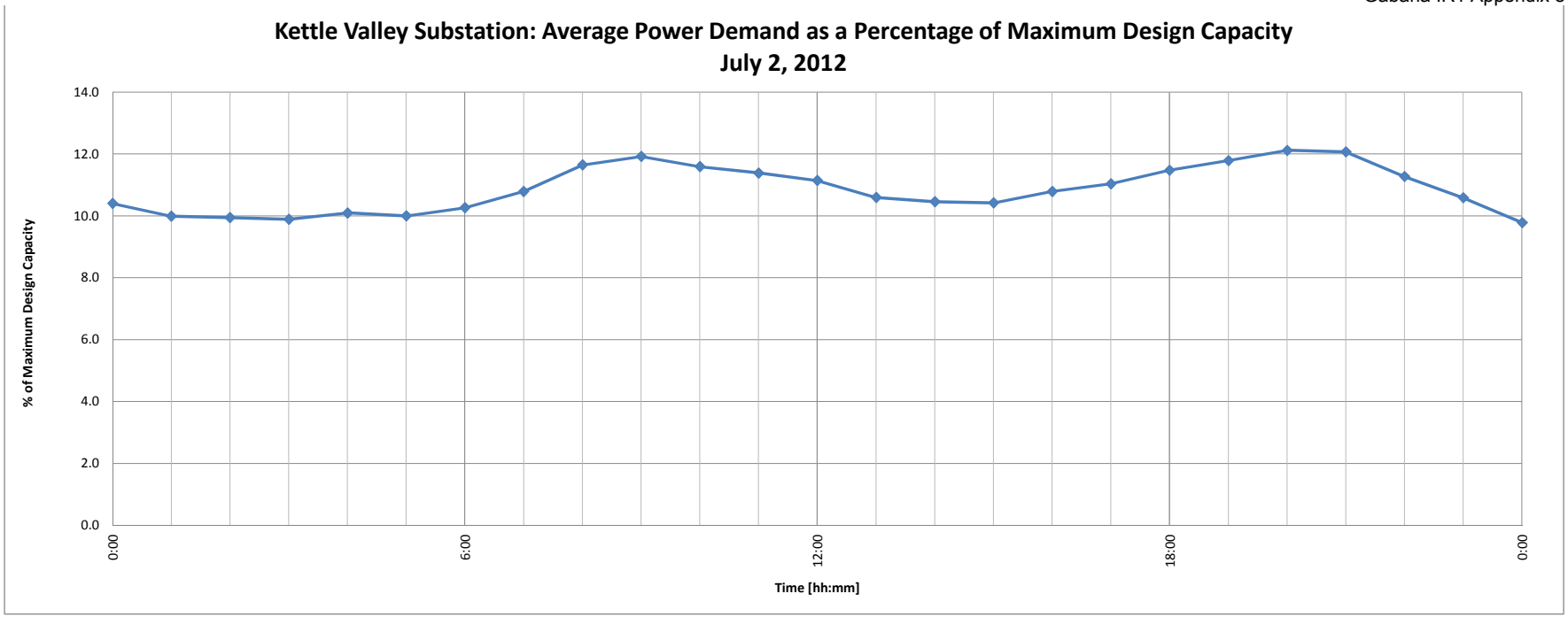
Kettle Valley Substation: Average Power Demand as a Percentage of Maximum Design Capacity
July 2, 2012
% of Maximum Design Capacity
14.0
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