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April 16, 2007

Alberta Energy and Utilities Board
640- 5th Avenue S.W.
Calgary, Alberta
T2P 3G4

Attention: Mr. Jamie Cameron, Application Officer

Dear Sir:

Re: Alberta Energy and Utilities Board ("Board") Application No. 1485517 (the "Application"); Alberta Electric System Operator ("AESO") Transmission Tariff for January 1, 2007 to December 31, 2007; Dual Use Customers ("DUC") Responses AESO and Intervener Information Requests regarding Exhibit 229 PSC issues

I am enclosing the DUC's information request responses to the AESO and interveners in the above Application, with the attachment to CG-DUC-2(a).

I trust the Board will find the enclosed satisfactory.

Please address any communications regarding the enclosed to my attention.

Yours truly,

MONTE S. FORSTER

AESO-DUC-1

Reference: POD Charges and PSC Evidence of DUC – Page 6, Lines 13-16

"4. The PSC should be adjusted to be 15% of the POD Charges for customers who own their own transformation assets.

5. The PSC should be adjusted to be 55% of the POD Charges for customers who own their own transformation assets."

Request:

Please fully explain what is meant by recommendations 4 and 5, as they appear to be the same, except for different percentages.

Response:

There is a typographical error under item 5 in the Executive Summary on page 6 of Exhibit 229. The revised wording is as follows:

5. The PSC should be adjusted to be 55% of the POD Charges for customers who own their own substation assets.

The DUC PSC proposal is fully explained in Exhibit 229 and specifically at section 4.0 of Exhibit 229 on pages 34 to 37.

AESO-DUC-2

Reference: POD Charges and PSC Evidence of DUC – Page 16, Lines 12-15

> "This evidence suggests that incremental transformation costs above 25 MVA are about $10,000 to $30,000/MVA. These values are significantly less than the AESO's recommended Cost Function that proposes incremental costs of $154,000/MW for all interconnections above 7.5 MW."

Request:

Please fully explain how DUC has accounted for the additional redundancy, line terminations, and increasingly complex bus arrangements which typically accompany transformation capacity greater than 40 MW. Please include a discussion of the implications relating to interconnection costs.

Response:

Please see CG-DUC-1 c) and CG-DUC-9 a) & b).

AESO-DUC-3

Reference: POD Charges and PSC Evidence of DUC – Page 30, Lines 5-9

> "In most instances, large substations over 40 MW would require multiple transformers. With more than one transformer, substations costs increase as additional breakers and other equipment is required. However, the AESO's definition of a standard service is a single transformer and associated equipment."

Request:

Please reconcile the referenced statement with the following:

a) Article 1.1 of the AESO's current tariff, which defines "standard facilities" to mean "the least-cost interconnection facilities which meet good transmission practice including applicable reliability, protection, and operating criteria and standards," and

b) the data in the attachment provided in response to Information Request TCE.AESO-001 Attachment in the TCE Complaint Against AESO Application of AESO Contribution Policy (Application 1431750) (attached to this request), which shows that over 80% of substations serving more than 40 MW of DTS contract capacity include two or more transformers.

Response:

a) We note that the full definition under Article 1.1 is as follows:[1]

> "AESO Standard Facilities" mean the least-cost interconnection facilities which meet good transmission practice including applicable reliability, protection, and operating criteria and standards, and generally consist of a single radial transmission circuit and a single transformer to supply an individual Point of Connection."[Underlining added]

The experience of the DUC members and their consultants is that regardless of the size of the substation or requirement for enhanced reliability the AESO will only provide a single transformer for a new service as standard facilities.

Further, the DUC has reviewed 37 AESO need applications from 2005 and 2006 (for new and expanded services of varying sizes) and note that none of the applications contain the provision of more than one transformer as standard facilities. While the provision of two or more

[1] AESO 2006 Terms and Conditions of Service, p. 2 of 64

transformers may have been the norm in prior years, more recent AESO policy appears to be the provision of a single transformer.

Based on the AESO's published Terms and Conditions of Service, and our own experience regarding the AESO's application of its Terms and Conditions of Service we have concluded that, as a matter of practice, the AESO currently only provides one transformer as part of its standard service.

b) AESO's Appendix G provides a sample set of interconnection costs incurred over the past six years, escalated to 2006 dollars. We submit that the AESO's proposed POD charge rate design should be based on a consistent methodology and data set.

The Board directed the AESO to enhance the POD cost function to improve the investment amounts under the AESO's contribution policy.[2] The AESO elected to utilize the revised POD cost function developed for the contribution policy to allocate POD costs and design the POD rate charges.[3] The AESO elected not to propose a POD charge rate design based on fully embedded costs, presumably because fully embedded cost data is not available on a POD basis.

The DUC is of the view that attempting to "mix and match" fully embedded costs (Appendix C Cost Causation Update) with current and future costs (Appendix G Contribution Study Data) for the design of the POD charges is inappropriate. Therefore, the DUC is of the view that the number of existing substations that have more than one transformer is irrelevant for the design of the POD charges. Since a consistent methodology and data set should be employed, mixing historical cost data based on prior policies of providing more than one transformer (see response to a) above) with cost data based on the current AESO policy of providing a single transformer as a standard facility is not appropriate.[4]

The DUC concedes that the AESO has the ability to determine that any sized substation should have multiple transformers under its definition of standard service. However, as the AESO's current (and anticipated)

[2] Section 4.3.4 of the application and Appendix F & G.

[3] Section 4.5.2 of the application and Schedule 5.5

[4] Examples of where it appears interested parties may be suggesting that consideration of fully embedded costs should be used in the AESO's proposed POD charge rate design methodology include:

- CCA/PICA evidence that suggests that the Appendix G data should be used, except for embedded cost data related to radial transmission lines from the Appendix C Cost Causation Update.
- The PPGA prepared a chart under PPGA-DUC-7 that compares the Appendix G data to existing POD (embedded) statistics and asks if the Appendix G data is representative of embedded statistics.

practice is that only one transformer will be designated as a standard service, it follows that the POD cost function should reflect the provision of a single transformer as part of the standard service and further that the POD charge rate design should reflect a single transformer.

CG-DUC-1

Topic: Substation Related Costs

Reference: Evidence, p.14

Preamble:

"It is anticipated that substation costs have some level of fixed costs, as the AESO suggests, and that there are some incremental costs that are related to size, e.g. transformers, breakers, etc. However, as discussed, we are of the view that substation costs do not continue to increase at the same rate with size. Below we provide evidence that shows that incremental substation costs above 30 MW should be limited to transformation costs, which increase with size at the much lower rate of about $10,000 to $30,000/MW."

Request:

a) Would DUC agree that since the costs of substations do not double every time the size of substations double, the AESO's proposed cost function reflects some economies of scale with increasing size of substations?

b) Would it be fair to characterize DUC's evidence as saying that the benefits of economies of scale increase progressively with size of substation whereas the AESO's proposal reflects an averaging of the economies of scale across all substations over 7.5 MW.

c) What specific components of substation costs would cause the progressively declining cost slope shown in Figure 6 (logarithmic function) as the size of the substation increases. Please elaborate by reference to specific components of transformer costs including installation costs.

d) Explain why DUC considers it just and reasonable to set the inflection point for the averaging of economies of scale at 40 MW as opposed to some other point in the cost curve.

Response:

a) No. We define economies of scale as a reduction in the unit cost ($/MW) with increased size. As we note, the AESO does recognize some economies of scale when comparing POD sizes above and below 7.5 MW. This is demonstrated by the unit cost of $621,000/MW for POD sizes below 7.5 MW and the unit cost of $154,000/MW proposed by the AESO for POD sizes above 7.5 MW. The problem arises in that the AESO's proposed cost function does not exhibit any further economies of scale for POD sizes above 7.5 MW. This is demonstrated by the uniform unit cost of $154,000/MW proposed by the AESO for all POD sizes above 7.5 MW.

Above 7.5 MW, the AESO proposes that the costs of substations will double every time the size of substations doubles. In our view, this is not appropriate.

b) Yes.

c) The DUC is of the view that up to a substation size of about 40 MW, most, if not all, of the major cost components of a substation are either fixed or do not exhibit significant economies of scale. For example, certain installation, land, ground grid, support structures, switches, communication and protection equipment etc. may be either fixed (do not vary with size) or exhibit limited economies of scale (have a large fixed component and a smaller variable component). However, once the base substation equipment is installed, larger substations (to the AESO's definition of a standard facility of one transformer) only require larger transformers to provide increased capability.

The DUC notes that the Appendix G data for substations up to 30 MW in size does exhibit some level of economy of scale as evidenced by the slightly better regression fit for a logarithmic equation as noted on Figure 6, page 13 of Ex. 229.

Please also see PPGA-DUC-5 a).

d) The 40 MW infection point was set based on our professional judgement and was selected on the high range of what we considered reasonable to provide the Board with a conservative recommendation. We submit that the inflection point could be set between 25 and 40 MW.

CG-DUC-2

Topic: Substation Related Costs

Reference: Evidence, pp.13-14

Preamble:

"In addition, using the best fit linear substation cost equation would suggest a substation cost of over $20 million, which does not appear consistent with the AESO's own cost data, especially considering that the AESO's standard substation would consist of a single transformer. Using the best fit logarithmic equation would suggest a substation cost for a 150 MW POD of only $7.9 million."

Request:

a) Please provide the excel spreadsheet including regression statistics supporting the logarithmic analysis which resulted in the function Y=1.7829LN(X)-0.9893.

b) The AESO states the majority of stakeholders felt that accurate, fully deconstructed actual projects costs were necessary in the development of the investment cost function. [CG AESO 11] Please comment on the appropriateness and accuracy of mixing a cost function arrived at by the AESO by looking at deconstructed actual costs with one that only looks at replacement cost for transformers in isolation.

Response:

a) The spreadsheet was provided as Ex. 232. Please see spreadsheet "DUC POD PSC Evidence App G Revised.xls," tab "Cost Function with Subs Only." Excel only provides the R^2 statistic with its Trendline option. Detailed regression statistics can be obtained by calculating the natural logarithm of the DTS size data and performing a linear regression. The resulting regression statistics are as follows:

Slope	1.78
Intercept	(0.99)
Standard Error for Slope Coefficient	0.50
Standard Error for Intercept Coefficient	1.33
R^2	0.33
Standard Error of the Cost Estimate	1.15
F Statistic	12.90
Degrees of Freedom	26.00
The regression sum of squares	16.99
The residual sum of squares	34.26

CG-DUC-8 a) Attachment provides a spreadsheet with these determinations.

b) The DUC agrees that the "fully deconstructed actual projects costs were necessary in the development of the investment cost function." Unfortunately the Appendix G data do not provide any data for interconnections over 40 MW. The DUC submits that the AESO's assumption that interconnection costs for new PODs over 40 MW do not, on average, exhibit any economies of scale is not accurate.

The DUC is not proposing to "mix and match" cost data for substation sizes under 40 MW – the DUC has supported the AESO's cost function for substation sizes up to 40 MW (under the premise that the Board adopts the AESO's methodology for deriving POD charges from the cost function). We are of the view that the provision of additional evidence to supplement the AESO's cost function for newer PODs over 40 MW, as provided by the DUC, was necessary and appropriate given the lack of data for interconnections over 40 MW.

CG-DUC-3

Topic: PSC-Isolated Generation

Reference: Evidence, p.39

Preamble:

"In the case of the isolated generation units, there is no cost saving choice. The lowest cost option, interconnection to the gird or isolation generation unit, is provided. There is no avoided investment that makes AESO customers better off, and hence their should be no tariff cost reduction (i.e. PSC) for the isolated generation PODs."

Request:

a) Please confirm for isolated generation there is no physical transmission substation or conventional transformer associated with the virtual PODs.

b) Given the requirement in the Regulation that the distribution system owner in whose area the isolated community is located must pay the Transmission Administrator for system access service as if the isolated community were being provided with system access service via the interconnected electric system, explain why fuel and other variable costs associated with isolated generation are relevant to the question of whether or not there is avoided investment associated with these sites for purposes of determining PSC eligibility.

Response:

a) There are no transmission substations at these isolated communities as the isolated generators are substitutes for the transmission substations. However, at the isolated generation facilities that serve remote communities substations are provided (which contain conventional transformers) to increase the voltage from the generation output level to the distribution level.

b) The substantially higher cost of the isolated generators as substitutes for the transmission substations is not directly relevant to the question of avoided costs for the purpose of determining PSC eligibility. However, as a secondary consideration, in our view, the substantially higher cost of the isolated generators does suggest that it may not be in the public interest to provide ATCO Electric with Primary Service Credits.

CG-DUC-4

Topic: Introduction and Recommendations

Reference: Evidence, page 6

Preamble:

"4. The PSC should be adjusted to be 15% of the POD Charges for customers who own their own transformation assets.

5. The PSC should be adjusted to be 55% of the POD Charges for customers who own their own transformation assets."

Request:

Please clarify the inconsistency between Recommendations 4 and 5.

Response:

There is a typographical error under item 5 in the Executive Summary. Item 5 should have referenced substation assets. Please see AESO.DUC-1.

CG-DUC-5

Topic: PSC

Reference: Evidence, page 36

Preamble:

"We recommend that the PSC be adjusted up to 40 MW for customers (if any) who only own their own transformers (15% of our recommended POD Charges):

a) $515.00/MW/month for the first 7.5 MW of Billing Capacity in the Billing Period, multiplied by the Substation Fraction, plus

b) $128.00/MW/month for the next 32.5 MW of Billing Capacity in the Billing Period, plus

c) $166.00/MW/month for all Billing Capacity over 40 MW in the Billing Period, plus

d) $714.00/month in the Billing Period, multiplied by the Substation Fraction."

Request:

Please explain why the DUC recommended POD charge of $166.00/MW/month for Billing Capacity over 40 MW is not adjusted by the 15% factor similar to the other components.

Response:

Ex. 229 states at page 37, lines 9 to 12:

> For POD sizes over 40 MW, our recommended cost function is based on the premise that the only incremental cost element is transformation. Therefore we recommend that the PCS for Billing Capacity over 40 MW be set equal to our recommended POD charge for Billing Capacity over 40 MW ($166/MW/month).

The $166/MW/month credit equates to the recommended cost function of $30,000/MW for POD sizes above 40 MW and is primarily based on transformation costs. If transformation costs are avoided, the credit of $166/MW/month should apply, regardless if the customer owns the transformation or the entire substation.

CG-DUC-6

Topic: PSC

Reference: Evidence, page 40 and AESO 2005-2006 GTA Refiling (Application No. 1420890), Attachment B – Rate Calculations, Schedule 5.2 Refiled Revised, November 14, 2005.

Preamble:

The AESO is proposing that the quantum of the 2007 Primary Service Credits paid to the 2006 PSC eligible customers be reduced to $3.2 million. Our recommendations would increase the total to about $3.5 million. These are significant reductions from the $6.2 million paid under the AESO's 2006 tariff.

Request:

In the referenced 2005-2006 GTA Refiling the AESO provided a 2006 Forecast of Primary Service Credits as $3.8 million. Please discuss and provide DUC's understanding of the reasons for the difference between the AESO Refiling forecast amount of $3.8 million and the amount of $6.2 million referenced in the DUC Evidence.

Response:

The DUC is not in a position to comment on the accuracy of the AESO's refiling forecast as presented on Attachment B, Schedule 5.2, line 6 (page 14 of 61 of the pdf version) of the AESO's November 14, 2005 refiling application to the Board.

The AESO provided the $6.2 million value for 2006 PSC. This value was referenced in Ex. 229 on page 40, line 5 is from the DUC spreadsheet as noted under footnote 55. The source of the $6.2 million value is the AESO's response to a CG information request filed as Schedule CG.AESO-017 (b-c) p1.

The $6.2 million value appears directionally correct.

CG-DUC-7

Topic: PSC

Reference: Evidence, page 35 and 37 and excerpts from 2006 GTA filing

Preamble:

With the availability of better interconnection cost data and the proposed POD rate design we are of the view that the PSC should properly reflect the fact that most PSC customers have supplied not only their own transformers, but the entire substation.

The substation cost data suggests that 55% of interconnection costs are substation related. It therefore follows that for customers who own their own substations the PSC should be set at 55% of the POD charges, as shown in Figure 19.

We also recommend that the PSC be adjusted up to 40 MW for customers who own their substation (55% of our recommended POD Charges):

……

Background — The current Customer-Owned Substation Credit is available to customers who own and operate their own substations, the costs of which are not included in the AESO's revenue requirement. A proposal to expand the credit to a Customer-Owned Transmission (COT) Credit, which would include other transmission facilities and be calculated on a customer-specific basis, has been explored in prior EUB proceedings. [AESO 2006 GTA, January 28, 2005, Section 4, Rate Design, page 30 of 51]

Application of Primary Service Credit — As already noted, section 12(1)(a) of the Transmission Regulation provides for the ownership and operation of transmission facilities by the incumbent transmission facility owner. In accordance with the Regulation, the AESO will directly assign transmission projects to incumbent TFOs, including all high voltage switching equipment, buswork, and associated land. However, a customer may still elect to own and operate the step-down transformer, and by doing so may be eligible for the Primary Service Credit. [AESO 2006 GTA, January 28, 2005, Section 4, Rate Design, page 35 of 51]

Request:

a) Is DUC proposing that the current PSC be expanded to include a new Customer-Owned Substation Credit (COS); please discuss.

b) Since the COS and the Customer-Owned Transmission Credit (COT) has been explored and replaced with the PSC in the previous 2006 AESO preceding and Decision what is the basis for DUC resurrecting this old proposal in this proceeding.

c) Please discuss the apparent conflict of the DUC proposal with the Transmission Regulation where the AESO directly assigns transmission projects to the incumbent TFO, including all high voltage switching equipment, buswork and associated land.

Response:

a) No, the DUC is not prosing a COS credit. If the Board adopts the AESO's proposal of designing the POD charges using the cost function developed for the contribution policy (Appendix F & G), then the DUC is proposing that the PSC should be similarly designed to reflect the costs avoided by customer investment in either transformation or the entire substation.

b) The DUC is not resurrecting an old proposal. The DUC is attempting to assist the Board with the provision of additional evidence that enhances the AESO's new and revised methodology for the determination of the level of POD charges and the PSC. The DUC is not proposing that customer investment in transmission lines (the genesis of the historical COT proposal) be incorporated into the PSC.

c) The AESO has stated that there is no conflict for substations built and owned by customers after the enactment of the *Transmission Regulation*. The DUC agrees. For substations built and owned by customers prior to the enactment of the *Transmission Regulation* there is no issue. Please see DUC.AESO-016(a).

CG-DUC-8

Topic: PSC

Reference: Evidence, page 41

Preamble: Table 6, POD and PSC Charges

Request:

Please provide the DUC understanding of the 'Other MW' column amounts that are in addition to DTS and STS amounts at the substation and are included in the determination of the substation fraction

Response:

The source of the "Other MW" values in Table 6 of Ex. 229 is the AESO's response to a CG information request filed as Schedule CG.AESO-017 (b-c) p1. The DUC is unclear of the AESO's definition of the "Other MW".

CG-DUC-9

Topic: PSC

Reference: Evidence, Page 19

Preamble:

- The transformer cost data suggests that incremental transformation costs are under $30,000/MW for transformers above 25 MVA.
- Since the AESO Recommended Cost Function is based on the provision of a standard service (one transformer), incremental substation costs above 40 MW should be limited to transformation as no additional breakers or other major equipment items would be included in the standard service cost (all other costs are deemed optional facilities and are paid for by the customer).
- The additional information provided suggests that incremental transformation costs are under $30,000/MW for transformers above 25 MVA, therefore we recommend a cost function with an incremental cost of $30,000 above 40 MW.

Request:

a) Please provide any supporting data that incremental substation costs above 40 MW will only be transformation costs.

b) Please discuss how the costs of transformer installation, buswork, switchgear, communication equipment and site work are impacted by varying substation sizes from 25 MW to 200 MW.

Response:

a) The DUC is not suggesting that incremental substation costs above 40 MW will be limited to transformation costs. However, when considering incremental costs for substations above 40 MW in size it is important to recognize which costs the AESO will include as standard facility costs, and, accordingly, which costs will be considered system costs covered by the AESO's contribution policy. In our experience, incremental system investments for substations above 40 MW in size are limited primarily to transformation costs. Please see AESO-DUC-3 a).

There may be some limited assets in addition to transformation that have incremental costs that increase with size above 40 MW, and are covered by the AESO's contribution policy. However, the DUC is of the view that these assets are appropriately included in the $30,000/MW value, as the evidence suggests that transformation costs are under $30,000/MW above 25 MVA.

Please also see PPGA-DUC-5 a).

b) As noted in response to CG.DUC-1 c), the costs of smaller substations with one transformer are anticipated to be primarily fixed and exhibit limited economies of scale. For larger substations over 40 MW with one transformer, the costs of installation, buswork, switchgear, communication equipment and site work will exhibit significant economies of scale as these items are comprised primarily of fixed costs. For larger substations over 40 MW with more than one transformer, the costs of installation, buswork, switchgear, communication equipment and site work will increase with the complexity of the substation to accommodate multiple transformers.

PPGA-DUC-1

Reference: Page 13, line 8 and page 14, line 3

Preamble: "The best fit logarithmic equation to the data suggests a slightly better correlation than the best fit linear equation as evidenced by the higher R^2 value (33% vs. 31%)".

"Using the best fit logarithmic equation would suggest a substation cost for a 150 MW POD of only $17.9 million."

Request:

Please confirm that the DUC is inferring that the logarithmic equation should be used in the analysis of substation costs and DTS capacities due to the slightly higher R^2 value of 33% (compared to 31%).

Please confirm:

a) If confirmed, please explain why this logarithmic line would be relevant to the large customers (over 40 MW) given that the line is derived from an analysis of substations data with a maximum DTS capacity of less than 30 MW.

b) If not confirmed, please explain the relevance of the chart, given the DUC's position that the AESO's analysis is insufficient since the Greenfield site data is limited to three sites above 30 MW?

Response:

The DUC is not implying that a logarithmic equation should be used in the analysis of substation costs and DTS capacities and is not recommending a logarithmic cost function. The DUC noted that a logarithmic equation provides a slightly better fit to the substation cost data than a linear equation. This may suggest that there is some economy of scale present for substations up to 30 MW in size. The DUC considers this relevant as it tends to support the premise that substations above 30 MW in size may similarly exhibit economies of scale. Please also see CG-DUC-1 c).

PPGA-DUC-2

Reference: DUC evidence document

Preamble: Please confirm the assumptions used in the DUC analysis.

Request:

Please confirm the following points with respect to the DUC's position regarding POD costs.

a) The AESO data is insufficient for loads over 40 MW – since only three data points exist in the Greenfield data above 30 MW. Please confirm:

b) The DUC is of the view that POD costs should be estimated for larger sites (greater than 40 MW) – and not based on any actual POD site data. Please confirm:

c) The DUC developed a breakpoint at 40 MW since a limited number of sites above 30 MW were present in the AESO Greenfield database. The DUC did not perform any statistical analysis in developing this breakpoint. Please confirm:

d) At a size of 40 MW, the DUC assumes that the only incremental cost of a new POD is a small charge for transformers, estimated by the DUC at $30,000/MW. The DUC has also assumed that PODs over 40 MW do not create additional costs for breakers, communications equipment, 240 KV lines and structures. Please confirm:

e) The DUC assumes that all PODs over 40 MW are able to connect on the 138 kV system, therefore the incremental costs of a 240 kV line and substation are not relevant to the analysis. Please confirm:

Response:

a) Confirmed.

b) Not confirmed. The DUC proposes that the POD costs above 40 MW should be based on the evidence provide by the DUC. The DUC does not agree that use of fully embedded cost data is consistent with the AESO's proposed POD charge rate design methodology. Please see AESO-DUC-3 b).

c) Not confirmed. Please see CG-DUC-1 d).

d) Not confirmed. Please see CG-DUC-1 c), CG-DUC-9 a) and AESO.DUC-3 a).

e) Not confirmed. Please see Ex. 229, page 12, lines 2 – 12 and Table 1, page 15 and PPGA-DUC-4.

PPGA-DUC-3

Reference: Page 9, Figure 2

Preamble: The PPGA wishes to understand the relevance of certain aspects of the analysis conducted by the DUC. In particular, the DUC states that "Of the 70 PODs over 40 MW average billing capacity, 90% have average billing load factors above 40%, and all but three PODs over 40 MW have average billing load factors above 5%."

Request:

Please explain the relevance of the analysis of billing capacity and load factor on the POD, investment or PSC analysis.

Please explain the purpose of including this data in the evidence filed.

Response:

The relevance of the information provided was to note the distribution of POD sizes by billing load factor and billing capacity. Despite the large number of PODs above 40 MW in size, the AESO was not able to provide any data for interconnection costs for substation over 40 MW in size. The lack of Appendix G data for PODs over 40 MW in size lead the DUC to file evidence on the estimated incremental cost of substations over 40 MW in size.

The purpose of the evidence was to place relevant evidence before the Board concerning the incremental cost of substations over 40 MW in size in support of the DUC's position, and hopefully to provide assistance to the Board and interested parties.

PPGA-DUC-4

Reference: Page 10, line 7

Preamble: The DUC states in its evidence that, "Undoubtedly there will be differences in unit transmission line costs ($/km) based upon voltage level, conductor size, type of structure used, geography, etc."

Request:

a) Please confirm that the DUC believes that transmission line costs will increase based upon voltage level and conductor size and type of structure. Please confirm:

b) If confirmed, please describe how the line interconnection costs for customers with 40 MW of DTS capacity, may differ from those of 200 MW of DTS capacity. Please describe:

c) If the DUC believes that the 200 MW customers may need to be supplied at 240 kV, please identify why the larger sized customer (200 MW) will not have a proportionately larger interconnection costs.

d) If the DUC believes that these larger customers will have higher interconnection costs, please describe how this is captured in the proposed DUC function.

e) If it is not captured, please describe how the DUC would plan to modify their function to account for situations where larger customers must connect to 240 kV.

Response:

a) Transmission line costs will generally increase as conductor size increases. Transmission line costs are generally higher for higher operating voltages. Transmission line costs will be higher or lower based on the type of structure used.

b) The DUC is of the view that for two substations of equal distance to an existing 138 kV or 240 kV transmission line, the transmission line interconnection costs will generally be higher for the 240 kV connection. However, the least cost interconnection option, which is primarily a function of distance, should always be utilized regardless of substation size. The DUC is aware of instances where very small loads are served from 240 kV lines (e.g. 720S Wabasca) and very large loads up to 200 MW are served at 138 kV (e.g. 409S Shell Scotford). Therefore, one cannot conclude that larger substations will be more costly to interconnect, as the costs will be a function of geography and the state of development of the interconnected system in the area.

c) The DUC does not believe that 200 MW customers need to be supplied at 240 kV.

d) As noted in b) and c) above, the DUC does not believe that larger customers will have higher transmission line related interconnection costs.

e) The DUC is of the view that the DUC recommended cost function does not need to be revised, as there is no evidence to suggest that larger PODs above 40 MW in size require higher transmission line interconnection costs that are treated as standard facilities.

PPGA-DUC-5

Reference: Page 19, line 7

Preamble: The DUC states in its evidence that "Since the AESO Recommended Cost Function is based on the provision of a standard service (one transformer), incremental substation costs above 40 MW should be limited to transformation as no additional breakers or other major equipment items would be included in the standard service costs (all other costs are deemed optional facilities and are paid for by the customer)."

Request:

a) In this analysis, does the DUC assume that the cost of a breaker to a 100 MW customer is the same as the cost to a 40 MW customer?

b) Does the DUC propose that the AESO not consider the cost of an appropriate breaker to be part of standard facilities?

c) Please describe why the incremental cost of the higher capacity breaker is not part of the DUC's proposed cost function?

Response:

a) As noted in Exhibit 229, the DUC has assumed that no additional breakers or other major equipment items will be included in standard service costs.[1] Moreover, the incremental cost of either a 138 kV or 240 kV breaker exhibits significant economies of scale. The cost of a 138 kV circuit breaker is driven by the voltage level (e.g. 138 kV) and the interrupting capability (e.g. typically 31 kilo amps (kA) or alternatively 40 kA). There is minimal cost increment to go from a 1,200 amp to a 3,150 amp 138 kV breaker nominal rating. Typically 138 kV circuit breakers are purchased with a 2,000 amp rating which is sufficient for loads from 10 MVA to nearly 275 MVA. Hence, the cost of a 2,000 amp breaker to serve a 40 MW or a 100 MW POD would likely be the same.

   Please also see CG-DUC-9 a).

b) No. Please see a) above.

c) Please see a) above. Any incremental costs are included in the DUC's analysis. The incremental cost of substation equipment other than transformers is anticipated to exhibit significant economies of scale and any incremental costs are included in the $30,000/MW estimate. Please also see CG-DUC-9 a).

[1] Ex. 229, page 19, line 5-6.

PPGA-DUC-6

Reference: Figure 10, page 23. Table 5, page 24. Figure 11, page 24. Figure 13, page 27

Preamble: The DUC has completed an analysis of rate impact based upon comparing 2006 to 2007 rates.

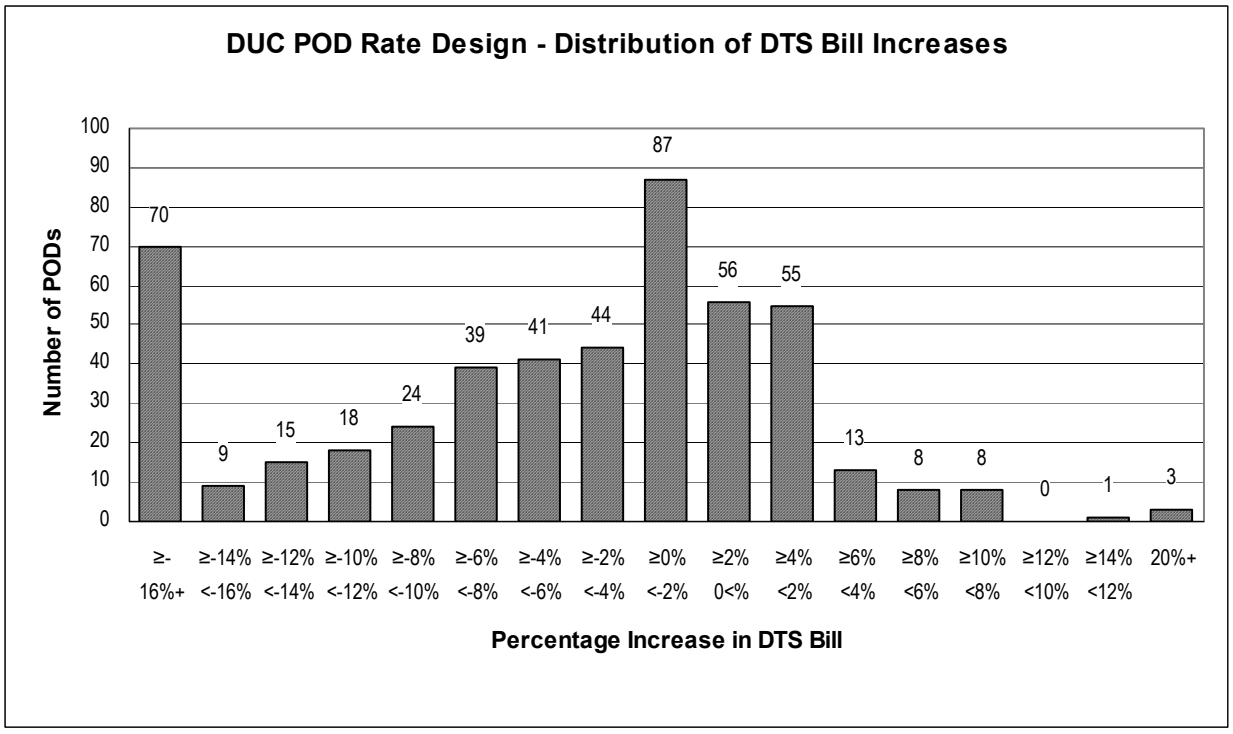
Request:

Can the DUC please reproduce these figures and tables by comparing 2005 DTS rates to 2007 DTS rates?

Response:

The following provide the requested comparisons. These comparisons were derived using the DUC spreadsheets filed as Exhibits 230 and 231.

Ex. 229, Figure 10 Revised - Distribution of Bill Increases from AESO 2005 DTS Rate to DUC Proposed 2007 DTS Rate:



Ex, 229, Table 5 Revised - Impact of Bill Increases from AESO 2005 DTS Rate to DUC Proposed 2007 DTS Rate

Impact of DUC POD Rate Design Recommendations
Summary of Average Per-POD DTS Monthly Bill Impacts for DTS Charges

Description	Billing Capacity (MW)						Total
	0 to <5	5 to <10	10 to <17	17 to <25	25 to <50	50 to 180	
Number of Accounts	101	92	100	65	82	51	491
AESO 2005	$4,917	$23,505	$42,051	$65,887	$113,208	$256,092	$68,209
DUC 2007 Recommended	$12,718	$51,434	$80,107	$109,942	$179,716	$370,949	$111,667
DUC Increases ($)	$7,801	$27,929	$38,056	$44,055	$66,508	$114,857	$43,458
DUC Increases (%)	158.6%	118.8%	90.5%	66.9%	58.7%	44.8%	63.7%

Figure 11 Revised - Price Change from AESO Proposed 2007 DTS Rate to AESO 2005 DTS Rate

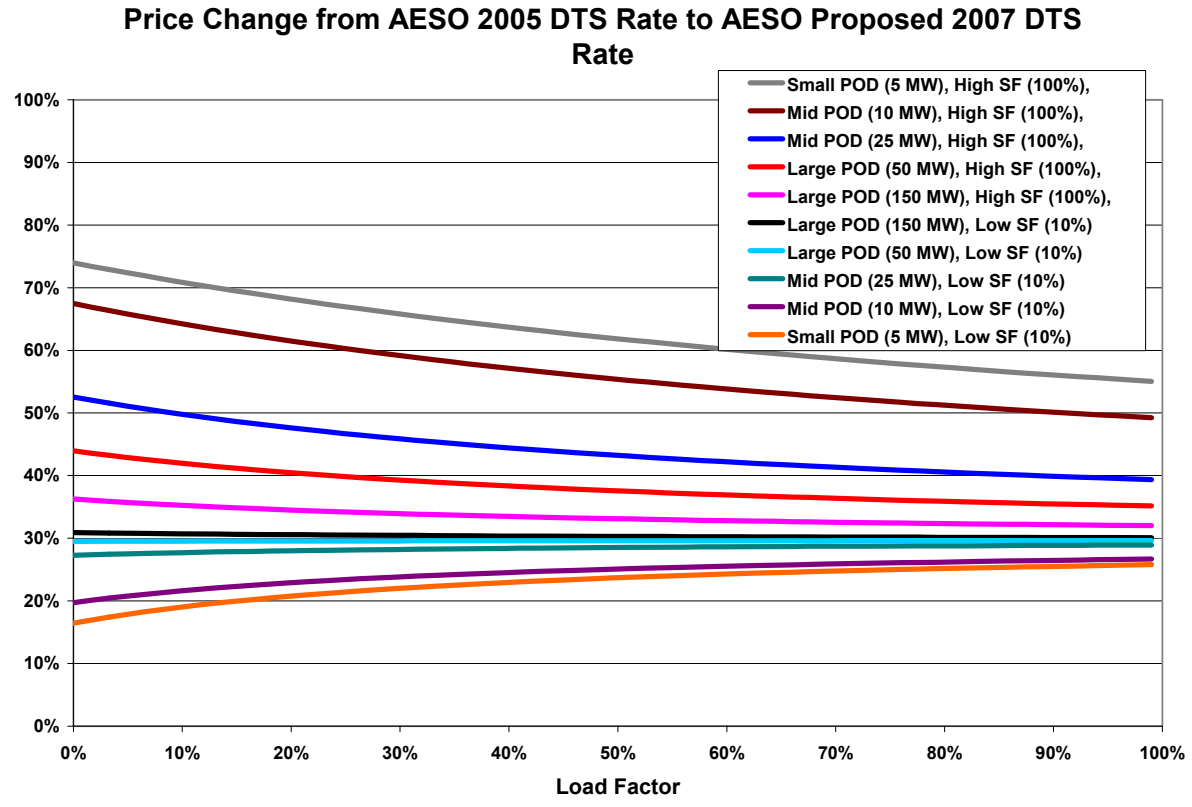
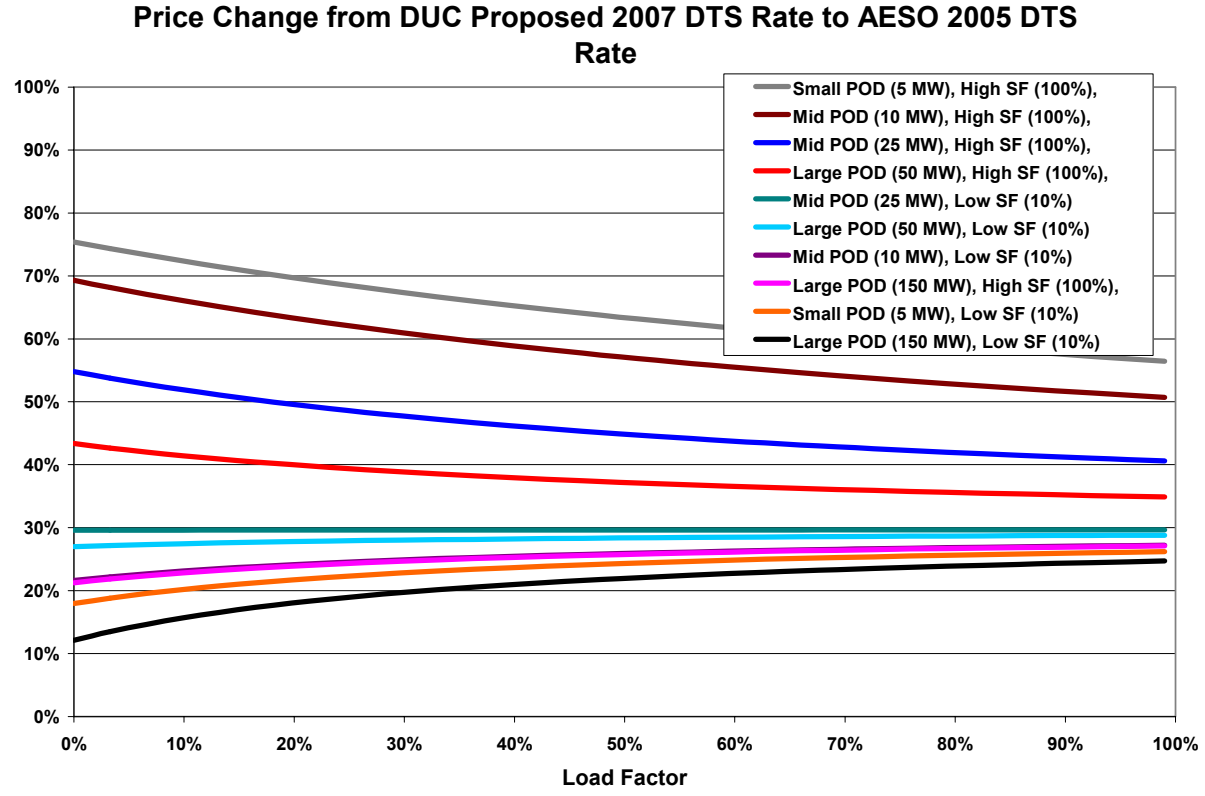


Figure 1 Revised - Price Change from DUC Proposed 2007 DTS Rate to AESO 2005 DTS Rate



PPGA-DUC-7

Reference: Page 8, line 2

Based on the DUC's referenced statement, the PPGA produced the following charts. The first chart depicts the percentage of Provincial PODs represented by the Greenfield data. The second chart compares the Greenfield data and the all POD data by DTS capacity.

Preamble: The DUC has stated that the AESO has not used a data sample set representative of interconnections above 40 MWs. "Unfortunately, the AESO only has three data points for new interconnections with DTS Contract Capacity above 30 MW."

Request:

Please comment on the DUC's assessment of the Greenfield data being representative of the all POD data as shown on the charts displayed.

Response:

The DUC is of the view that the Appendix G data does not have to be fully representative of historical data. Utilities often use a sample set of current costs to allocate embedded costs. Having stated this, in our view, it is important for the AESO to use a consistent data set to apply its proposed cost allocation methodology to properly derive the POD charge. Please see AESO-DUC-3 b).