

**RURAL RATE ASSISTANCE AS A RATEMAKING OR RATE RECOVERY  
APPROACH WHICH THE OEB SHOULD CONSIDER WHEN ASSESSING THE  
GENERIC HEARING ISSUES RELATED TO NATURAL GAS SYSTEM EXPANSION**

Prepared for

**THE MUNICIPALITY OF KINCARDINE;  
THE MUNICIPALITY OF ARRAN-ELDERSLIE; AND  
THE TOWNSHIP OF HURON-KINLOSS**

**(COLLECTIVELY, THE “MUNICIPALITIES”)**

March 21, 2016

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## **Overview & Purpose of Report**

The Ontario Energy Board (the “OEB”, or the “Board”) has initiated a generic proceeding to consider possible alternative ratemaking frameworks or rate recovery approaches to provide natural gas service to Ontario communities that do not currently have access to natural gas (EB-2016-0004). The following report provides a brief history of rural rate assistance for electricity services in Ontario.

Assistance to rural consumers constitutes a ratemaking framework or rate recovery approach whose original objective was to provide a funding mechanism to expand electricity services to unserved or underserved rural consumers in Ontario through taxpayer funding. After the electrification of rural Ontario, ongoing assistance to rural consumers was legislated through the establishment of rural rate assistance to help lower electricity costs associated with serving rural customers through transfers from urban electricity customers. While assistance to rural consumers was eventually mandated by legislation, it is a relevant and useful precedent for the Board to consider in this Generic Hearing since it represents an important, ongoing example of how transfers or subsidies between customers have been and continue to be utilized in Ontario to achieve provincial energy policy objectives.

This report discusses the history of rural electrification of Ontario and how this led to the development of rural rate assistance within the *Power Corporation Act* (the “PCA”), the legislation that established Ontario Hydro as a corporation in 1974. This report also describes the rate recovery process of calculating rural rate assistance and how the assistance was funded and provided to eligible rural residential customers.

### **Electrification of rural Ontario was achieved through transfers among customers & by taxpayers**

The electrification of rural Ontario occurred from 1911 to 1958, and over these 47 years various methods of combining self-supporting funding and Ontario government subsidies were used to fund that process. It appears that none of these specific methods survived on an ongoing basis. However, in 1981 the “rural rate assistance” approach was introduced into section 108 of the PCA. Rural rate assistance essentially transferred funds from urban electricity customers to the rural communities. Although section 108, along with much of the PCA, was repealed in 1998 the

calculation of rural or remote electricity rate protection continues today under Ontario Regulation 442/01. While the calculation in Regulation 442/01 differs from the calculation outlined in section 108 of the PCA, the principle remains the same – urban communities subsidize the electricity service provided to rural communities.

Ontario has a long history of, and precedents for achieving sustainable public policy objectives, such as rural electrification, through cross subsidies from urban to rural utility customers. Those subsidies ultimately have become law in the case of rural rate assistance, and they have endured through the PCA and its successor legislation for 35 years (1981 to 2016). As a result, it is recommended that the OEB consider a mechanism similar to rural rate assistance to mitigate the costs of expanding natural gas service to Ontario communities that do not currently have access to natural gas distribution systems – costs that would otherwise have to be fully borne by largely rural consumers.

### **A Brief History of Rural Electrification in Ontario**

On May 7, 1906, the Hydro-Electric Power Commission of Ontario (“HEPCO”) was formed under the *Power Commission Act*<sup>1</sup>, with authority to regulate the activities of privately owned power companies and to purchase energy from those same companies for resale to municipally operated utilities over a distribution system constructed and owned by the province.<sup>2</sup> Beginning in 1910, the publicly-owned HEPCO began delivering power to eight municipalities. By 1911, it was distributing 13,164 horsepower to twenty towns and cities between London and Toronto.<sup>3</sup> This same year, HEPCO began pursuing its goal of making electrical energy as widely available and used on farms and in rural hamlets as in urban centres.

HEPCO was responsible for rural electrification achieving a near monopoly over the distribution and generation of hydro-electricity in Ontario by the early 1920s.<sup>4</sup> Power supply to rural areas was, however, still in its infancy at this time.

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<sup>1</sup> *The Power Commission Act*, 1906, S.O. 7 Edw. VII, c. 19, s. 1. Available online: <http://archive.org/stream/v1revisedstatuteso1914ontauof#page/566/mode/2up>

<sup>2</sup> Keith Robson Fleming, *Power at cost: Ontario Hydro and rural electrification, 1911-1958*, McGill-Queen’s University Press: 1992 [Power at cost], at p.21

<sup>3</sup> Power at cost at p.7

<sup>4</sup> Keith Fleming, *The Uniform Rate and Rural Electrification Issues in Ontario Politics, 1919–1923*, Canadian Historical Review: 1983, 64:4, 494-518, at p.494.

In 1920, in an effort to ensure that the rural power program would be as self-supporting as the urban program, HEPCO established Rural Power Districts (“RPDs”) and an eight-class rate schedule.<sup>5</sup> HEPCO’s rate schedule, which had begun with a single “rural” classification in 1909, expanded to eleven classes between 1929-1943 (*see Table 1 below*), and shrank to five classes in 1967, immediately before HEPCO’s reconstitution as Ontario Hydro.<sup>6</sup>

On April 30, 1921, the Ontario government introduced Bill 262, *An Act to Make More Equal Provision for the Cost of Hydro-Electric Power in Ontario*, which established the Hydro-Electric Power Extension Fund.<sup>7</sup> The fund was comprised of revenues from Ontario’s waterpower rentals and was intended to be used to finance up to 50% of the annual construction and maintenance charges on HEPCO lines erected within RPDs. This 50% subsidy took effect on June 1, 1921 but was retroactive to all rural lines built prior to Bill 262’s enactment. In October 1921, HEPCO began erecting the first group of subsidized lines.<sup>8</sup>

Following the Ontario government’s decision to subsidize the cost of rural transmission and distribution lines by 50% in 1921, the legislature enacted a second bill in 1924 to further subsidize the costs of the distribution transformer and service connections.<sup>9</sup>

In 1930, as the economic situation in the province worsened, the Ontario government established the Rural Power Service Suspense Account (“RPSSA”) and made provisions for any revenue deficits to be transferred to this account, to be re-paid on a deferred basis.<sup>10</sup> The RPSSA made it possible to charge, during a given period, a rate which would otherwise result in revenue deficiencies for the RPD.

### **Basic Principles of Rural Electrification in Ontario**

The basic principles of the rural electrification scheme developed by the HEPCO can be summarised as follows:

- RPDs were formed;

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<sup>5</sup> Power at cost at p.54

<sup>6</sup> Power at cost at Appendix C

<sup>7</sup> Power at cost at p.64

<sup>8</sup> Power at cost at p.64

<sup>9</sup> Adrian N. Zomers, *Rural Electrification*, Twente University Press: 2001 [Rural electrification], at p. 89, available online: <http://doc.utwente.nl/38683/1/t0000008.pdf>

<sup>10</sup> Rural electrification at p. 89

- The geographical dimensions of the power districts, typically 250 km<sup>2</sup>, were determined primarily by the distances which could be economically bridged with sub-transmission lines from a distribution centre;
- The Ontario government subsidized 50% of the initial investment costs;
- In the RPDs where, even with the maximum service charge, a deficit arose, the Province of Ontario settled the deficit as a loan until all RPDs combined operated with a surplus.
- Each RPD paid for the operations and maintenance of the distribution system in its area and created a fund for the future replacement of equipment as well as a sinking fund to cover the investments made by HEPCO;
- A rural region could in principle be provided with electricity if three ordinary farms, or their equivalent, per 1.6 km of line would be connected; and
- The tariff was based on a service charge and a consumption charge. The service charge depended on the individual load demand. HEPCO, in 1930, had eleven classes of rural service with a range of demands from 0.75 kW to 15 kW coupled with a minimum required number of consumers per 1.6 km.<sup>11</sup> (See Table 1 below)

A standard service charge was set for each individual RPD; this charge was reduced if the number of consumers per kilometre of line increased. Prior to 1930, the service charge was strictly based on the objective of immediately avoiding deficits, and as a result many farmers could not afford electricity.<sup>12</sup>

The service charges in Table 1 below were introduced in 1930, together with legislation which made the Province of Ontario a guarantor for the financial performance of the RPDs, making a long term approach possible.

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<sup>11</sup> [Rural electrification] at p. 89

<sup>12</sup> [Rural electrification] at p. 89

**Table 1: Classification of services for Ontario rural power districts in 1930<sup>13</sup>**

Class of rural service	Service	'Units" per consumer	Approx. number of consumers per 1.6 km line	Demand permitted in kW	Nett annual service charge \$ct	kWh per month at initial rate
1B	Hamlet Light	2.25	6.8	0.75	16.20	30
1C	Hamlet Light	3.75	4.0	2.0	25.20	30
2A	House Light	1.90	8.0	1.0	18.60	30
2B	Small farm serv.	3.50	4.3	2.0	25.20	30
3	Light farm serv.	5.00	3.0	3.0	30.00	42
4	Medium farm serv.	5.35	2.8	5.0	32.40	70
5	Medium farm serv.	7.50	2.0	5.0	45.00	70
6A	Heavy farm serv.	12.50	1.2	9.0	55.80	126
6B	Heavy farm serv.	12.50	1.2	9.0	63.60	126
7A	Spec. farm serv.	20.00	0.74	15.0	83.40	210
7B	Spec. farm serv.	20.00	0.70	15.0	100.20	210

Note: Prior to the construction of a distribution line, the agreed connection of consumers equivalent to a total of 15 "units" per 1.6 km line had to be secured. In 1938 this requirement was reduced to two ordinary farms or 10 "units".

The initial rural service charges did not cover actual costs but the underlying assumption was that an increase in the number of consumers per length of line, and the increased consumption which would result, would lead to greater economies of scale. At the beginning of the electrification of rural areas the service charges were relatively high and, as a result, wealthier individuals were connected first. This later created opportunities for the gradual connection of consumers with less spending power.<sup>14</sup>

<sup>13</sup> [Rural electrification] at p. 90

<sup>14</sup> [Rural electrification] at p. 90

The rate of return on investments varied from approximately 13% at the beginning, to 10% in the later stages of the Ontario government's rural electrification programme.<sup>15</sup> These figures have been corrected to exclude the effect of the aforementioned subsidies.

After World War II, power stations were constructed far from load centres and this resulted in long, high-voltage lines crossing vast areas. Some of the rural communities living near these lines were supplied with electricity through special technical solutions, such as capacitive coupling systems.<sup>16</sup>

Rural electrification in Ontario was considered "complete" in 1958, at which point 95% of the farms in the province were connected to the public power network.<sup>17</sup>

### **Rural Rate Assistance pursuant to the *Power Corporation Act***

In 1974, HEPCO was reconstituted as a crown corporation known as Ontario Hydro and the *Power Commission Act* became the PCA.<sup>18</sup> In 1981, the Ontario legislature amended the PCA<sup>19</sup> to implement the "rural rate differential" discount otherwise known as rural rate assistance. This assistance was established to alleviate the differential between the costs of electricity in rural areas compared to urban communities. In section 108 of the PCA, Ontario Hydro was required to forecast the rural rate differential each year. Where it forecasted a differential which exceeded 15%, Ontario Hydro was responsible for fixing discounts from the rates to be charged for power consumed each month in rural residential premises in the following year. These discounts were to be calculated so as to result in a forecast rural rate differential of 15% on a yearly basis.

While distribution service to rural residential customers would therefore remain more expensive than the service provided to their urban counterparts, the rate differential would be capped at 15%. Ontario Hydro had the authority to increase the price payable for power by any municipal commissions or other persons it supplied with power in order to recover any difference in Ontario Hydro's revenue that was forecast to occur as a result of the rural rate differential.

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<sup>15</sup> [Rural electrification] at p. 90

<sup>16</sup> [Rural electrification] at p. 90

<sup>17</sup> Power at cost at p. 248

<sup>18</sup> *Power Commission Amendment Act, 1973*, s.o. 1973, c. 57, which renamed the *Power Commission Act* as the *Power Corporation Act*

<sup>19</sup> 1981, c. 41, s.2

These excerpts from section 108 of the PCA outline the calculation of the rural rate differential:

108. (1) In this section,

"municipal commission" means municipal corporation or municipal commission or the trustees of a police village supplying power that is supplied to it or them by the Corporation;

"municipal residential premises" means premises that are supplied individually with power by a municipal commission and that the Corporation decides are used for residential purposes on a year-round basis;

"rural rate differential" means the amount by which the weighted average rural bill exceeds the weighted average municipal bill, expressed as a percentage of the weighted average municipal bill;

"rural residential premises" means premises that are supplied, either individually or in conjunction with a farm, with power by the Corporation under this Part and that the Corporation decides are used for residential purposes on a year-round basis;

"weighted average municipal bill" means the amount obtained by:

- (a) multiplying the amount payable to each municipal commission for the first 1,000 kilowatt hours of power consumed per month in a municipal residential premises by the number of municipal residential premises supplied with power by the municipal commission,
- (b) adding together the products obtained in respect of all municipal commissions in accordance with subclause (a), and
- (c) dividing the sum obtained in accordance with subclause (b) by the total number of municipal residential premises supplied with power by municipal commissions;

"weighted average rural bill" means the amount obtained by,

- (a) multiplying the amount payable under each rate class of the Corporation that applies to rural residential premises for the first 1,000 kilowatt hours of power consumed per month by the number of rural residential premises within the class,
- (b) adding together the products obtained in respect of all classes in accordance with subclause (a), and
- (c) dividing the sum obtained in accordance with subclause (b) by the total number of rural residential premises.

- (2) The Corporation shall forecast the rural rate differential each year for the next following year.
- (3) Where the Corporation forecasts a rural rate differential that exceeds 15 per cent, the Corporation shall fix discounts from the rates to be charged for power consumed each month in rural residential premises in the next following year.
- (4) The discounts shall be calculated to result in a forecast rural rate differential of 15 per cent on a yearly basis.
- (5) The Corporation may increase the price payable for power by municipal commissions and any of the other persons supplied with power by the Corporation in order to recover any difference in the revenue of the Corporation that is forecast to occur as a result of the application of subsections (2) to (4).
- (6) Subsection (5) applies despite any contract entered into between the Corporation and a municipal commission or other person.

## Rural Rate Assistance Calculation

The first step in the calculation of rural rate assistance was to determine the weighted average total bill at 1000 kWh per month for all residential customers in Municipal Electric Utilities (“MEUs”). Prior to the restructuring of Ontario Hydro and the Ontario distribution sector in the late 1990s and early 2000s and the opening of Ontario’s wholesale and retail electricity markets in 2002, there were over 300 MEUs in Ontario and the weighted average municipal bill reflected the residential bills of all MEUs. The following table outlines the approach used to calculate the weighted average municipal bill using ten illustrative MEUs, but when the actual weighted average municipal bill was determined all MEUs (i.e. over 300) were included in calculation.

**Table 2: Weighted Average Municipal Bill**

Municipal Electric Utility	Total Bill @ 1000 kWh per month (A)	Number of Residential Customer (B)	(C)= (A) x (B)
1	\$89.57	175,000	\$15,675,231
2	\$86.76	100,000	\$8,675,538
3	\$90.46	80,000	\$7,236,929
4	\$95.85	60,000	\$5,751,273
5	\$98.52	40,000	\$3,940,943
6	\$92.26	20,000	\$1,845,176
7	\$95.42	10,000	\$954,183
8	\$91.11	5,000	\$455,563
9	\$96.58	2,000	\$193,160
10	\$97.76	1,000	\$97,761
<b>Total</b>		<b>493,000</b>	<b>\$44,825,755</b>
Weighted Average Municipal Bill = Total (C) / Total (B) = \$44,825,755 / 493,000 = 90.92 per month			

The second step in the calculation of rural rate assistance was to determine the weighted average rural total bill at 1000 kWh per month for all rural residential customers eligible for rural rate assistance. Rural rate assistance was available to all year round residential customers and

residential farm customers. A residential farm was a farm which also included a farm house on the property. The following table outlines the calculation of the weighted average rural bill using illustrative numbers.

**Table 3: Weighted Average Rural Bill**

Rural Rate Class	Total Bill @ 1000 kWh per month (D)	Number of Eligible Rural Rate Assistance Customers (E)	(F)= (D) x (E)
Year Round Residential	\$125.10	450,000	\$56,293,120
Residential Farm	\$118.00	100,000	\$11,799,930
Total		550,000	\$68,093,050
Weighted Average Rural Bill = Total (F) / Total (E) = \$68,093,050 / 550,000 = 123.81 per month			

The final step in the calculation of rural rate assistance was to compare the weighted average rural monthly bill to the weighted average municipal bill with a 15% adjustment applied as directed in section 108 of the *Power Corporation Act*. The difference between the weighted average rural monthly bill and the adjusted municipal bill is then applied to the number of eligible rural rate assistance customers times 12 to determine the total rural rate assistance on an annual basis. The calculation of rural rate assistance is provided in the following table and provides a rural rate assistance amount that is consistent with the level of rural rate assistance determined in the mid to later 1990s.

**Table 4: Rural Rate Assistance Calculation**

Weighted Average Rural Monthly Bill (G)	\$123.81
Weighted Average Municipal Monthly Bill (H)	\$90.92
Weighted Average Municipal Monthly Bill plus 15% (I) = (H) x 1.15	\$104.56
Rural Rate Differential above 15% (J) = (G) - (I)	\$19.24
Number of Eligible Rural Rate Assistance Customers (K) = (E)	550,000
Rural Rate Assistance (L) = (J) x (K) x 12	\$127,000,000

## **How Rural Rate Assistance was funded and provided**

Each time Ontario Hydro revised the wholesale cost of power rates an amount of rural rate assistance was included in the wholesale cost of power reflecting the forecasted rural rate assistance at that time. This allowed the collection of rural rate assistance from all wholesale customers of Ontario Hydro. The amount collected was reflected as a credit to year round rural residential customers and residential farm customers when the electricity rates for these customers were designed by the rural retail division of Ontario Hydro. The rural retail division of Ontario Hydro was essentially equivalent to the current distribution business of Hydro One Networks Inc.

## **Conclusion**

The electrification of rural Ontario occurred from 1911 to 1958, and over these 47 years various methods of combining self-supporting funding and Ontario government subsidies were used to fund the power system that provided electricity to rural communities. In 1981 the rural rate assistance method was introduced into section 108 of the PCA which essentially provided funding from urban consumers to rural consumers.. Although section 108, along with much of the PCA, was repealed in 1998, the calculation of rural or remote electricity rate protection continues today under Ontario Regulation 442/01, and while the calculation in Regulation 442/01 is different than the calculation outlined in section 108 of the PCA, the principle is still the same – urban consumers subsidize rural consumers.

It is clear that Ontario has a long history of, and precedents for achieving sustainable energy policy objectives, such as rural electrification, through provincial subsidies and cross subsidies from urban to rural customers that have been in place in one form or another for almost a century. The most recent approach, that of rural rate assistance, has been enshrined in the legislation governing Ontario's electricity distribution sector for approximately 35 years (1981 to 2016).

As a result, the Board should consider and can take guidance from rural rate assistance as a “made in Ontario” rate recovery and ratemaking approach as it considers how to implement

existing Provincial policy to expand natural gas services to Ontario communities that currently do not have access to natural gas.

TOR01: 6256328: v1

BORDEN LADNER GERVIAS  
**BRUCE BACON**

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**PROFILE**

- A Senior Consultant with over thirty five years of experience in the electricity and natural gas industries evaluating the short and long term financial and pricing impacts of business alternatives.
- Proven record of success in managing the development of cost of service and cost allocation models, delivering presentations to senior management, preparing submission to the Ontario Energy Board (OEB), National Energy Board (NEB) and the Régie de l'énergie (Régie) as well as testifying before the NEB, the OEB and the Régie.
- Highly skilled in training, motivating and influencing staff as well as setting priorities and coaching teams.
- A strong team player, an excellent analyst and an effective communicator with strong interpersonal skills.

**Experience**

**BORDEN LADNER GERVAIS: SENIOR UTILITY RATE CONSULTANT  
November 2007 - Present**

- Assisted 43 electric local distribution companies (“LDCs”) in the preparation of over 100 rebased/cost of service rate applications since 2008 which includes a number of applications under the new Renewed Regulatory Framework for Electricity (“RRFE”).
- Provide ongoing strategic regulatory advice to numerous LDCs within Ontario.

**ELENCHUS RESEARCH ASSOCIATES: SENIOR CONSULTANT  
May 2003 – November 2007**

- Assisted 25 LDCs in completing their cost allocation studies.
- Consultant to the OEB in preparing the OEB paper and cost allocation model used by LDCs in their recent cost allocation studies.
- Member of OEB Cost Allocation Working Group.
- Assisted in the preparation of numerous Distribution Rate Applications for over 15 LDCs
- Testified before the OEB supporting LDC Distribution Rate Applications.
- Member of four working groups for OEB 2006 Distribution Rate process.

**ECONALYSIS CONSULTING SERVICES: SENIOR CONSULTANT  
1999 to 2003**

- Conducted power pricing studies for generation clients in Ontario.
- Supported the preparation of unbundled Distribution Rate Applications and Retail Transmission Rate Applications for over 30 electric local distribution companies within Ontario.
- Conducted distribution cost allocation studies for Hydro One, Oakville Hydro and St. Catharines Hydro.
- Conducted a cost efficiency study for Festival Hydro, St Thomas Energy and Woodstock Hydro Services.
- Participated on the OEB PBR Distribution Rate Task Force; the OEB Retail Settlement Code Task Force and the OEB Distribution System Code Task Force
- Testified at the OEB Generic Hearing on changes to the implementation of market-based rate of return.
- Prepared evidence and testified at the Régie on transmission rate design for Hydro Quebec.

**ONTARIO HYDRO: MANAGER, MARKETING SERVICES, CONSUMER & SMALL BUSINESS  
MARKETS, OHSC  
1996 to 1998**

- As a member of the Power Purchasing project, developed working knowledge of power trading and risk management techniques in order to risk manage the purchase of power from the power pool.
- Prepared various position papers for the Market Design Committee (MDC) to address retail market design issues and supported the OHSC representative at the MDC.
- Responsible for the calculation of Rural Rate Assistance.

**ONTARIO HYDRO: SENIOR ADVISOR - STRATEGIC MARKETING, ONTARIO HYDRO  
RETAIL  
1995 - 1996**

- Directed a province wide team to develop a service charge and energy rate structure for 960,000 Ontario Hydro Retail customers.
- Assisted in the review of cost efficiency gains by rationalizing the operations of over 48 individual local Rural Area office structures.
- Responsible for the calculation of Rural Rate Assistance

**ONTARIO HYDRO: STRATEGIC ADVISOR - RETAIL RATES AND FORECASTS, RETAIL SYSTEM  
1990 - 1995**

- Responsible for setting and gaining approval of retail rates for 960,000 residential and small business customers.
- Provided analytical support to the 1994 Joint Study into Retail Electricity Service in Ontario.
- Responsible for the calculation of Rural Rate Assistance

**TRANSCANADA PIPELINES LTD: SUPERVISOR, PIPELINE COST ANALYSIS  
1988 - 1990**

- Directed the preparation of long-term financial/rate impact studies submitted to the NEB for a \$1.2 billion and a \$2.5 billion pipeline expansion program.
- Testified before the NEB supporting the impact studies.
- Gained extensive knowledge of the supply and transmission business in the regulated natural gas industry.

**TRANSCANADA PIPELINES LTD: ASSISTANT SUPERVISOR, PIPELINE COST ANALYSIS  
1986 - 1988**

- Supervised the system development of TransCanada's financial and rate forecasting model.

**EDUCATION**

**Marketing Management Program**  
Ivey Business School, London, 1997

**B.Sc. Mathematics**  
York University, Toronto, 1979

**FORM A**

Proceeding EB-2016-0004

**ACKNOWLEDGMENT OF EXPERT'S DUTY**

1. My name is Bruce Bacon. I live at Markham, in the province of Ontario.
2. I have been engaged by or on behalf of the Municipalities to provide evidence in relation to the above-noted proceeding before the Ontario Energy Board.
3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:
  - (a) to provide opinion evidence that is fair, objective and non-partisan;
  - (b) to provide opinion evidence that is related only to matters that are within my area of expertise; and
  - (c) to provide such additional assistance as the Board may reasonably require, to determine a matter in issue.
4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date: March 21, 2016



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*Signature*