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BY EMAIL and RESS

October 3, 2016
Our File: EB20160152

Ontario Energy Board
2300 Yonge Street
27th Floor
Toronto, Ontario
M4P 1E4

Attn: Kirsten Walli, Board Secretary

Dear Ms. Walli:

Re: EB-2016-0152 – Ontario Power Generation 2017-2021 – SEC Interrogatories

We are counsel to the School Energy Coalition ("SEC"). Enclosed, please find the interrogatories on behalf of SEC.

Yours very truly,
Jay Shepherd P.C.

Original signed by

Mark Rubenstein

cc: Wayne McNally, SEC (by email)
Applicant and intervenors (by email)

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ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act 1998*, Schedule B to the *Energy Competition Act*, 1998, S.O. 1998, c.15;

AND IN THE MATTER OF an application by Ontario Power Generation Inc. pursuant to section 78.1 of the *Ontario Energy Board Act, 1998* for an Order or Orders determining payment amounts for the output of certain generation facilities.

INTERROGATORIES

ON BEHALF OF THE

SCHOOL ENERGY COALITION

1. GENERAL

1.2-SEC-1

The application proposes substantial increases in the prices to be charged for OPG generation in the next decade and beyond, particularly from the nuclear facilities. Please provide a detailed analysis of the OPG's strategy to deal with potential demand destruction as the cost of OPG generation from its nuclear facilities, increases. Please provide all forecasts, estimates, or other future-looking documents that consider:

- a. The price levels at which OPG generation becomes uncompetitive,
- b. The price levels at which customers start to exit the grid to avoid OPG generation costs,
- c. The numbers of customers, kwh volumes, and capacity requirements that will cease to rely on OPG generation at various price levels, or
- d. The options available to the OPG to avoid demand destruction and its recursive price impacts.

1.2-SEC-2

Please provide summaries of all internal audit reports conducted since 2014, their findings, recommendations, and the status of any actions that are to be taken.

1.2-SEC-3

Please provide copies of each of OPG's 2013 to 2017 corporate scorecards.

1.2-SEC-4

Please provide a copy of all shareholder directives that may impact the OPG's regulated business. Please provide details of any changes to any shareholder directives that were in place at the time of OPG's last payment amounts application (EB-2013-0321).

1.2-SEC-5

Please provide a copy of all benchmarking analysis, reports, opinions and/or assessments, undertaken by OPG or for OPG since 2014, regarding any aspect that directly or indirectly relates to costs or activities of its nuclear business, or those that are indirectly are allocated to the nuclear payment amounts, that has not already been included in the pre-filed evidence.

1.3-SEC-6

Attached is a spreadsheet setting out the nuclear and hydroelectric payment amounts, actual and proposed, for the period 2011 to 2026 inclusive, together with calculations of the impacts of those payment amounts on Ontario schools. To ensure that the impacts only reflect increases in OPG charges, school consumption has been kept constant at the 2013 BPS (Broader Public Service) reported volumes, and the split between hydroelectric and nuclear consumption has also been kept constant. In answering this interrogatory, please assume that the volumes for schools are correct. The rider for rate smoothing has been treated as part of base rates, rather than a separate rider. All other riders are treated as riders rather than base rates. The forecasts assume that the OPG's new payment amounts order is dated and effective January 1, 2017.

With respect to the spreadsheet and the impacts of the application on Ontario schools:

1. Please confirm that the payment amounts inserted in the spreadsheet are correct, and the calculations, based on those payment amounts are correct.
2. Please complete the years 2022-2026 for the Unsmoothed Rates with no Riders category using the OPG's most current estimates of those rates. If those estimate are not the same as the estimated used to estimate the smoothed rates of 11% annually for ten years, please explain the differences.
3. Please complete all years 2011-2026 for the Smoothed and Unsmoothed Rates with and without Riders, using the OPG's actual and forecast riders for 2011-2016, and the OPG's most current estimate of riders for all subsequent periods.
4. Please confirm that, under the OPG's proposal:
 - a. Ontario schools can expect to pay, in base payment amounts, \$79.5 million per annum more in 2026 than in 2011, a compounded annual growth rate in payment amounts to OPG of 6.7% per year for fifteen years. If that is not correct, please provide the correct calculation. Please calculate the same figure including rate riders.
 - b. Ontario schools can expect to pay, in base payment amounts for nuclear, \$74.3 million per annum more in 2026 than in 2011, a compounded annual growth rate in payment amounts to OPG of 8.2% per year for fifteen years. If that is not correct, please provide the correct calculation. Please calculate the same figure including rate riders.
 - c. Ontario schools can expect to pay, in base payment amounts, \$72.4 million per annum more in 2026 than in 2061, a compounded annual growth rate in payment amounts to OPG of 8.7% per year for ten years. If that is not correct, please provide the correct calculation. Please calculate the same figure including rate riders.
 - d. Ontario schools can expect to pay, in base payment amounts for nuclear, \$69.4 million per annum more in 2026 than in 2016, a compounded annual growth rate in payment amounts to OPG of 11.0% per year for ten years. If that is not correct, please provide the correct calculation. Please calculate the same figure including rate riders.
 - e. The OPG is proposing that, on average, Ontario schools should pay amounts for OPG generation each year over the next ten years that are 61.4% higher than 2016 payment amounts for the same amount of generation.
5. Please provide all examples in the possession of the OPG showing comparable long-term increases in generation rates for customers, and details surrounding the reasons for those increases. Please provide a comparison of the increases proposed by the OPG to the increases proposed (or charged) by the comparators.

2. RATE BASE

2.1-SEC-7

Please provide a list of all capital projects, between 2016 and 2021 that OPG believes are subject to the Nuclear Capacity Refurbishment Variance Account due to O. Reg. 53/05. For each, please provide the project name, the date they are expected to go in-service, the forecast cost, and a summary of why OPG believes they meet the requirements under O. Reg. 53/05.

2.1-SEC-8

[<https://news.ontario.ca/opo/en/2016/09/maximizing-the-value-of-publicly-owned-assets.html>]

With respect to OPG's head office:

- a. Please provide status of the sale of the head office. When does OPG expect the sale to occur?
- b. Please provide an estimate of the potential sale price of the head office. Please provide copies of all appraisal reports OPG has obtained.
- c. For the purpose of this application, what assumptions has OPG made regarding the sale of the head office, including but not limited to changes in rate base, depreciation, and OM&A.
- d. Please explain how OPG has allocated the gains from the sale to ratepayers.
- e. Please provide all shareholder guidance and/or instructions OPG has received regarding the sale of the head office.

3. CAPITAL STRUCTURE AND COST OF CAPITAL

3.1-SEC-9

Please provide a list of periodic reports that are made to Executive Management of the OPG, its Board of Directors or committees, or any part of the government of Ontario, dealing with planned or achieved ROE. For each category of such reports (e.g. Board of Directors), please provide all such reports delivered in the most recent two years.

4. CAPITAL PROJECTS

4.3-SEC-10

[D2/2/2, p.5] Please provide further details explaining what specific services each of the Owner Support Services contractors are providing.

4.3-SEC-11

[D2/2/2; EB-2013-0321] Please file all confidential pre-filed evidence, updated evidence, interrogatory responses, technical conference undertakings, and oral hearing undertakings regarding the DRP project filed in EB-2013-0321.

4.3-SEC-12

[D2/2/2, Attach 2, p.11] Please provide a copy of the most recent version of all listed Program Management Plans (PgMPs). Please also provide copies of all other DRP related PgMPs that are not listed.

4.3-SEC-13

[D2/2/2, Attach 2, p.23] Please provide a copy of the most recent version of all DRP related Project Management Plans (PMPs).

4.3-SEC-14

[D2/2/3, p.7-8] Please provide copies of all reports, analysis, opinion, evaluations and/or assessments

undertaken by or for OPG regarding the RFR contracting process, strategies, and contract structure, undertaken either before, during, and/or after the issuance of the RFR and negotiating the final contract.

4.3-SEC-15

[D2/2/3, p.11-14] Please provide a similar chart showing the following scenarios for the RFR Target Pricing:

- a. Contractor cost overrun of 25%
- b. Contractor cost overrun of 50%
- c. Contractor cost overrun of 75%
- d. Contractor cost overrun of 100%

4.3-SEC-16

[D2/2/3/p.15] With respect to the \$333 Engineering Services and Equipment Supply contract with Alstom as part of the Turbine Generator work bundle:

- a. Please explain how OPG can demonstrate the reasonableness of the contract if it was conducted on a sole source basis.
- b. Please explain what analysis was undertaken to reach the conclusion that the OEM was the best option to undertake the work project.
- c. Please provide copies of all reports, analysis, opinion, evaluations and/or assessments undertaken by or for OPG, regarding the appropriateness of the contract being awarded on a sole source basis.
- d. Please provide a similar chart as that provided for the RFR Target Pricing (Chart 1-4, D2/2/3), for each of the following cost scenarios Engineering Services and Equipment Supply contract:
 - i. Contractor cost savings of 1%
 - ii. Contractor cost savings of 10%
 - iii. Contractor cost overrun of 1%
 - iv. Contractor cost overrun of 10%

4.3-SEC-17

[D2/2/3/p.16] With respect to the \$284M Turbine Generator EPC contract for field work and engineering integration with SNC/AECON JV as part of the Turbine Generator work bundle:

- a. Please provide a similar chart as that provided for the RFR Target Pricing (Chart 1-4, D2/2/3), for each of the following cost scenarios for the Turbine Generator EPC contract for field work and engineering integration:
 - i. Contractor cost savings of 1%
 - ii. Contractor cost savings of 10%
 - iii. Contractor cost overrun of 1%
 - iv. Contractor cost overrun of 10%
 - v. Contractor cost overrun of 25%
- b. Please provide a copy of the Memorandum of Agreement between OPG, Alstom, and SNC/AECON JV.
- c. Please provide copies of all reports, analysis, opinion, evaluations and/or assessments undertaken by or for OPG regarding the Turbine Generator EPC contracting process, strategies, and contract structure, undertaken either before, during, and/or after the negotiating the final contract.
- d. Was no RFP or similar competitive process undertaken for this contract because SNC/AECON JV had already been selected to undertake the RFR work? If so, please explain why this contract was not then part of the selection process for the RFR contract with SNC/AECON JV.

4.3-SEC-18

[D2/2/3] Does OPG have its own model that calculates the effect of different cost overrun scenarios for any or all of the PRP contracts? If so, please provide a full electronic copy.

4.3-SEC-19

[D2-2-11, Attachment 3] Does OPG have a management reserve for the DRP? If so, please provide details. If not, please explain why not.

4.3-SEC-20

[D2/2/4, p.3-4] With respect to Lessons Learned:

- a. For each project referenced, please provide the specific issues that were faced, the specific lessons OPG has learned, and the basis for those lessons.
- b. Please provide all reports, analysis, opinion, evaluations and/or assessments undertaken by or for OPG, regarding lessons learned from other projects.
- c. OPG states, “Insufficient front-end planning as a primary source of megaproject failures identified by statistical information based on benchmarking of 318 mega projects”. Please provide the full source of this information including the benchmarking information referenced.
- d. OPG identified as a lesson learned that “[n]uclear operating companies do not have the resources or the capabilities to manage and execute large projects.” Please explain how retaining overall management responsibility and oversight is a reason to that lesson learned.

4.3-SEC-21

[D2/2/4, p.3-4] Please provide a table showing all individual capital projects previously undertaken by OPG (and its predecessor Ontario Hydro) with a final cost of at least \$250M (in 2016 dollars) in the previous 30 years. For each of those projects, please provide the following information:

- a. Name and description of the project.
- b. Original forecast budgeted capital cost.
- c. Final capital cost.
- d. Capital cost variance.
- e. Rationale for cost variance (if +/- 10%).
- f. As applicable, lesson learned from the cost variance to the planning of the DRP project.
- g. Original forecast project completion/in-service date.
- h. Actual project completion/in-service date.
- i. Schedule variance.
- j. Rationale for schedule variance.
- k. As applicable, lessons learned from the schedule variance to the planning of the DRP project.

4.3-SEC-22

[D2/2] For each of the listed expert reports, please provide a list of all information and materials, including but not limited to, all documents, memorandums, notes of meetings with the OPG’s employees, data requests and responses, and sources of research, that the consultant used or had access to, for the purpose of drafting their report. For all of this information and materials not already on the record in this proceeding, please provide copies.

- a. [D2/2/2, Attach 1] Concentric Energy Advisors, *Assessment of the Commercial Strategies Developed For the Overall Darlington Refurbishment Projects and the Retube & Feeder Replacement Work Package* (September 2013)
- b. [D2/2/11, Attach 1] Concentric Energy Advisors, *Updated Assessment of the Commercial Strategies Developed For the Overall Darlington Refurbishment Projects and the Retube & Feeder Replacement Work Package* (July 2016)
- c. [D2/2/11, Attach 3] Testimony of Dr. Patricia D. Galloway, of Pegasus Global Holdings Inc. (July 2016)

4.3-SEC-23

[D2/2/3] Please detail all efficiency and productivity measures built into any of the major work bundle contracts for DRP. Please reference the specific sections of the contracts where they can be found.

4.3-SEC-24

[D2/2/3] Please describe the specific off-ramp provisions of each of the major work bundle contracts. Please reference the specific sections of the contract where they can be found.

4.3-SEC-25

[D2/2/3] For each work bundle, please provide:

- a. A detailed breakdown of the costs.
- b. A copy of the estimate summary report or similarly named document (note: SEC understands from OPG that for each work bundle there is a detailed summary report of the contract cost final estimates).

4.3-SEC-26

[D2/2/7] With respect to the DRP contingency amount:

- a. [p.2; D2/2/8, Attach 2, p.33] Please confirm the modelling expert referenced was from the Palisade Corporation.
- b. [D2/2/8, Attach 2, p.33] Please provide a copy of the report provided by Palisade Corporation.
- c. [D2/2/8, Attach 2, p.33] Please explain which recommendations of Palisade Corporation were not implemented.
- d. Please provide the results of the Monte Carlo simulation, including any reports, opinions and analyses that were created for OPG, or by OPG, regarding the results of the simulation.
- e. Please explain how the individual risks were costed for the purpose of the Monte Carlo simulation.
- f. [p.4] Please provide a copy of both, the current DRP risk register and the register used at the time of the Monte Carlo simulation.
- g. [p.4] Please highlight the difference between the current DRP risk register differs from the register used at the time of the Monte Carlo simulation.
- h. [Attach 1, p.5] Please provide further details of the “Risk Management and Oversight Tool” (“RMO”); specifically, please explain what the tool is and how it will be used through the DRP process.
- i. [Attach 1] Who are the authors of the KPMG Report? Please provide a copy of their CVs.

4.3-SEC-27

[D2/2/7] What would the required contingency be for a cost confidence level of 70%, 75%, 80%, 85%, 90%, 95% and 99%.

4.3-SEC-28

[D2/2/8] With respect to the DRP costs:

- a. [p.3] Please provide a copy of all AACE standards, guidelines, direct and/or other similar documents used by OPG in the DRP budgeting and project planning process.
- b. [p.4] Based on the AACE estimate classifications for each work bundle please provide the total potential DRP budget based on the high and low end of the expected accurate ranges.
- c. [p.8-9] Please provide a similar analysis as part (a) for only the forecasted in-service additions requested in this application.

4.3-SEC-29

[D2/2/8, p.12] Please provide further details regarding how OPG worked with the RFR contractor (SNC/AECON JV) to determine the RFR budget. Please explain step-by-step how the budget was determined.

4.3-SEC-30

[D2/2/8, Attach 1, p.9] The DRP Execution Phase Business Case Summary states that:

“OPG will recover prudently incurred costs via the Ontario Energy Board (OEB) rate approval process (O. Reg. 53/05) once the units are refurbished and returned to service. The risk is that there is no assurance that all costs are recoverable through this process.

OPG continues to discuss with the Province the need for greater assurance of cost recovery and has suggested regulatory changes to facilitate this.”

- a. Please confirm that the costs that would not be recoverable are costs the OEB finds imprudent.
- b. If so, please explain why OPG “needs” greater assurance of cost recovery above that of the costs the Board finds are prudently incurred.
- c. Please detail what regulatory changes OPG has suggested to the government to provide “greater assurance of cost recovery.”

4.3-SEC-31

[D2/2/8, Attach 1, p.24] Please provide a copy of the referenced “overall contract strategy document” for the DRP, as well as additional referenced “contract strategy documents” for each major work bundle.

4.3-SEC-32

[D2/2/8, Attach 2] With respect to the Burns & McDonnell Canada and Modus Strategic Solutions (“BMCD/Modus”) Canada *Nuclear External Oversight Assessment Report of DR Team’s Process for Developing the RQE Estimate* Report (November 12 2015):

- a. [p.2] Please provide a copy of the referenced, i) August 2013 Initial Assessment, ii) November 2014 Observations of the 4d Cost Estimate, iii) February 2014 Assessment Report on the DR Risk Program, assessments/reports.
- b. [p.10] Please provide the basis of OPG’s \$700M in potential savings included in the 3d cost estimate.
- c. [p.10-11] Please explain the major drivers of the variances between the SNC/Aecon June 2014 class 3 estimate, Rev.0 submission of its Class 2 estimate (May 2014), and the final estimate.
- d. [p.11] Please explain why BMCD/Modus believes that it was a “major accomplishment” that OPG achieved \$63.7M in savings from its Class 3 estimate, when it originally forecasted \$700M.
- e. [p.11] Has OPG finalized the Division of Responsibility Matrix to further define the functional costs? If so, what are the results of the further definition of those costs?
- f. [p.11] Why has OPG terminated Black & McDonald as the contractor for the D2O Storage work?

- g. [p.12] Please provide a copy of the referenced 'RQE Quality Assessment Report'.
- h. [p.16] Please explain specifically how OPG undertook the "vetting process" of the SNC/AECON estimates. In answering this question, please provide a few illustrative examples.
- i. [Appendix D] Please provide OPG's response to each of BMcD/Modus observations/findings and recommendations.

4.3-SEC-33

[D2/2/8, Attach 3] With respect to KPMG, *RQE Governance & Process Review and RQE Cross Cutting Vertical Slice Review* (November 6 2015):

Who are the authors of the KPMG Report? Please provide a copy of their CVs. Please include what relevant experience they have conducting cost estimate reviews of similar projects of the size and scope of the DRP.

- a. [p.7, Table 2] Please confirm the risk categories are those defined by KPMG and not AACE.
- b. [p.57] KPMG states that for the purposes of primary research, it conducted interviews with three employees who had experience planning and managing nuclear refurbishment projects. Please provide a copy of all notes, transcripts, memorandums, or similar documents detailing those interviews.
- c. [p.57] KPMG lists 9 other nuclear refurbishment and/or construction projects that it researched for the purposes of providing best practices and lessons learned. Please provide a copy of all documents that KPMG reviewed.
- d. [p.75] Please provide a copy of the Program level Basis of Estimate.

4.3-SEC-34

[D2/2/8, Attach 4] With respect to the *Expert Panel Review – Class 2 Estimate Report* (November 24 2015):

- a. [p.4] Please provide a copy of the referenced Compliance Chapter Report (509407-0000-00000-33RA-0173 "Class 2 Milestone – Compliance").
- b. [p.10] Please provide a copy of the Class 3 Estimate audit plans and findings.
- c. [p.10] Please provide a copy of the 191 comments provided to OPG, the 63 responses provided by OPG, and any subsequent comments provided by OPG.
- d. [p.17] The Report states that "[t]he Panel was not provided complete visibility to all internal risk evaluations due to the confidential and commercial sensitive nature." Which risk evaluations were not provided to the Expert Review Panel?
- e. [p.17] Please provide a copy of all of those internal and external DRP risk evaluations conducted by or for OPG that have not already been provided in the pre-filed evidence.
- f. [p.19] Has OPG executed the Standby Plan? If so, please provide details. If not, when does OPG expect to complete execution of the Standby Plan.

4.3-SEC-35

[D2/2/9, p.9] Please provide a copy of all DRP internal audits reports/findings from audits conducted to date.

4.3-SEC-36

[D2/2/9] Please provide details of all compliance activities and oversight of the DRP required or undertaken by the CNSC. Please explain if there are any further CNSC approvals or reviews that will take place during the test period regarding the DRP.

4.3-SEC-37

[D2/2/9, p.9] With respect to the Refurbishment Construction Review Board:

- a. Please provide a list of members and their qualifications.
- b. Please provide a copy of all reports they have provided to date.

- c. Does OPG expect to provide a public version of their reports? If not, would OPG object to doing so?

4.3-SEC-38

[D2/2/9, Attach 1] With respect to the Change Management Process:

- a. [p.1] Please provide a copy of the Change Control Form.
- b. [p.1] Please provide a copy of any internal guide or policy regarding the DRP Change Management Process.
- c. [p.2-3] Please explain specifically when a change is required to be approved by the Change Control Board and when it is required to be approved by the Program Change Control Board.

4.3-SEC-39

[D2-2-9, Attach 2] With respect to the BMcD/Modus, *Report to the Darlington Refurbishment Committee Board of Directors* (November 12, 2015):

- a. [p.4] The report says that “the DR Team has substantially met the goals it set in 2009 at the DR Project’s inception for the definition stage”. What goals has OPG not met that it set for itself in 2009?
- b. [p.4] Please provide the performance metrics that SNC/Aecon are providing for its critical path activities.

4.3-SEC-40

[D2-2-11, Attach 3] With respect to the Testimony of Dr. Patricia D. Galloway, of Pegasus Global Holdings Inc.:

- a. [p.109] Please provide a description of each listed nuclear engagement that Dr. Galloway has undertaken previously.
- b. Has Dr. Galloway ever testified before a court or tribunal as an expert or issued on a similar subject as that of her report/testimony in this processing? If so, please provide a copy of all testimony and any filed expert reports.
- c. Please provide a copy of the full documents referenced in footnotes: 24, 25, 26, 27, 37, 50, and 52.
- d. [p.55] In Dr. Galloway’s experience with nuclear projects, please discuss what confidence level is used.

4.3-SEC-41

[D2/2] With respect to human resourcing of the DRP, please explain how:

- a. SNC/Aecon plans to recruit the resources needed for the RFR project and the status of those plans.
- b. Existing OPG Unit 2 employees will be utilized/redeployed during the Unit 2 Refurbishment.
- c. OPG will ensure that its project management team and labour force has the appropriate expertise.
- d. OPG will ensure that the required resources are in place to meet the DRP schedule.
- e. Contractor resources and OPG resources will be integrated and scheduled.

4.4-SEC-42

[D2/2/10] For each capital project that is related to a Darlington facility that will be rebased at the same time, please categorize the project into the following categories:

- a. Required for the refurbishment of the Darlington units;
- b. Being undertaken during the refurbishment period due to the difficulty or impossibility of undertaking the project on a fueled reactor;
- c. Being undertaken during the refurbishment period for another reason. Please provide that reason.

4.4-SEC-43

[D2/1/1, p.7] Please provide further details regarding the following continuous improvement initiatives:

- a. Centre of Excellence for project management
- b. Collaborative Front End Planning

4.4-SEC-44

[D2/1/1] With respect to its continuous improvement initiatives:

- a. For each year between 2017 and 2021, please provide the annual savings OPG expects from its continuous improvement initiatives. Please detail all assumptions made in its calculation.
- b. What is the OM&A and/or capital cost for each continuous improvement initiative.
- c. Please provide the business case for each continuous improvement initiative.

4.4-SEC-45

[D2/1/1, p.8] With respect to OPG's plan to improve project cost and schedule predictability:

- a. Please explain provide further details regarding the plan to implement "a revised approval process for the Nuclear Operations project portfolio".
- b. Please provide any documents outlining this new approval process.
- c. Regarding OPG's improved plan for estimating project cost and schedules. Please provide an illustrative example of how a project would have previously been estimated, and how it would be estimated based on the proposed changes.
- d. How much better does OPG expect it will improve initial estimates based on its improved plan?

4.4-SEC-46

[D2/1/2] Please provide a table showing for each capital nuclear capital project (tier 1, 2 and 3) that will go in-service between 2014 and 2016, its forecasted cost and its actual cost. Please provide an explanation for all variances +/- 5% and why it is prudent. Please provide a copy of all Project Over-Variance Approval documents for those projects not already included in the pre-filed evidence.

4.4-SEC-47

[D2/1/3, p.16] With respect to the Security Physical Barrier System (Project #25609):

- a. Please provide further details regarding the claim made the subcontractor.
- b. Please explain why OPG is responsible for costs of a settlement of a claim by a subcontractor to the EPC vendor?

4.4-SEC-48

[D2/1/3, Attach 1, Tab 1] With respect to the Operations Support Building Refurbishment project?

- a. Who was the EPC contractor for the project?
- b. Why was the contract not a fixed price?
- c. Please provide the original Business Case Summary.

5. PRODUCTION FORECASTS

5.1-SEC-49

[E2/1/1] For each 6 month delay in refurbishment of Darlington unit 2, please provide the revised production forecast per year. Please also provide the change in proposed payment amounts as a result.

5.1-SEC-50

[E2/1/1] Please provide a table showing each of OPG's planned outages: i) a general description of the outage, ii) the timing of the outage, iii) the length of the outage, iv) the specific units affected, and v) the forecast production (TWh) lost due to the outage.

5.1-SEC-51

[E2/1/1, p.7] With respect to OPG's notice to the IESO regarding a planned outage:

- a. How much notice does OPG generally give the IESO with a request for approval of planned outage?
- b. How often does the IESO not approve an OPG planned outage?
- c. When it does deny an outage request, generally how much delay is caused when the outage will ultimately take place as compared to the requested date?

5.1-SEC-52

[E2/1/2] Please discuss the OPG's actual 2016 nuclear production forecast to date as compared to the forecast.

6. OPERATING COSTS
6.1-SEC-53

[F2/1/1, p.14] What is the makeup of the OPG Nuclear Executive Committee? How often do they meet?

6.1-SEC-54

[F2/1/1, p.15, Table 4] Please provide the full operational and financial targets for each year between 2017 and 2021.

6.1-SEC-55

[F2/1/1, p.19] For each of the listened initiatives, please provide the expected OM&A savings for each year between 2017 and 2021.

6.1-SEC-56

[F2/1/1, p.19] Please provide further details regarding the Human Performance Initiative. Please explain specifically how OPG is planning on improving "supervisory effectiveness and leadership oversight".

6.1-SEC-57

[F2/2/2, p.20] What are the 19 deliverables of the Parts Improvement Initiative?

6.1-SEC-58

[F2/1/1, p.21] Please provide full details regarding the Workforce Planning and Resource Initiative. Please provide copy of any formal OPG document setting out the details of the initiative.

6.1-SEC-59

[F2] For each unit, please provide a table showing the Force Loss Rate, by year, and by contributing cause.

6.1-SEC-60

[F2/2/2] For Nuclear Base OM&A, please provide a cost driver table showing the sources of the year-over-year increases from 2015 (Board Approved) through to 2021.

6.1-SEC-61

[F2/3/1, p.3, 8-12] Please explain how OPG plans to reduce and minimize project write-off costs during the test period.

6.1-SEC-62

[F2/3/3, Table 1,2a, 2b] With respect to Tier 1 and Tier 2 projects, please provide a revised table 2a and b that shows for each project listed (as applicable):

- a. The actual start date and the actual/revised final completion date.
- b. Total project cost.
- c. Total costs to be recovered for each year between 2017 and 2021.

6.2-SEC-63

[F2/1/1, Attach 1] With respect to the 2015 Nuclear Benchmarking Report:

- a. Please provide a copy of the 2014 and 2016 versions of the report.
- b. Please provide a full breakdown of the calculation of the 3-Year Total Generation Cost per MWh (TGC/MWh) for both Darlington and Pickering. Please explain which of the categories of costs that OPG is seeking to recover in this application are included and which are not included.
- c. [p.6] Please provide disaggregated information for Pickering A and Pickering B.
- d. [p.6] Please provide the benchmark Results – Plant Level Summary table for each year since 2010.

6.2-SEC-64

[F2/1/1, Attach 2] With respect to the Goodnight Consulting Benchmarking Report:

- a. [p.14] Please explain why each of the ‘CANDU-Specific Exclusions’ functions are specific to CANDU reactors so that they could not be benchmarked.
- b. [p.22] Please explain any changes to the raw adjustments from the report provided in EB-2013-0321.
- c. [p.24] Please explain the basis for the 1.8 scaling factor.
- d. [p.33] Please provide a copy of the 2014 Goodnight Consulting US Nuclear Plant Staffing Newsletter.
- e. [p.29] Please provide a copy of Appendix A.
- f. OPG has said that in 2016 it will be at or close to benchmark. Please confirm that OPG means that its 2016 staffing will be at or close to the 2014 benchmarking as identified in the Goodnight Consulting Benchmarking Report. If not, please provide the basis for its statement.
- g. [p.31] Based on the premise of part (f), please provide a similar table to page 31 that shows which functions OPG is above or below the benchmarking.

6.2-SEC-65

[EB-2013-0321] With respect to the KPMG *Assessment of Organizational and Structural Opportunities at OPG* report (December 6, 2012):

- a. Please provide an update on OPG’s implementation of any recommendations set out in the report.
- b. Please quantify the savings achieved since 2014 regarding any recommendations that were implemented.

6.3-SEC-66

[F2/5/1] On average, a reduction in production of 1 TWh in 2017 would represent how much of a reduction in fuel costs?

6.5-SEC-67

[F2/2/3, p.3] With respect to Pickering Continued Operations:

- a. Please provide a list of all the CNSC approvals required to operate Pickering units to 2022 and 2024 from the original planned shutdown in 2020. Please provide an update on each of the approvals and if they have not been received, when OPG expects each specific approval to be given.
- b. Please explain what OPG will do if it does not receive CSNC approvals for continued operation of the Pickering Units till 2022 and 2024. Please detail all potential budget and financial impacts between 2017 and 2021.

6.5-SEC-68

[F2/3/2/, p.2] Please provide a breakdown, for each year between 2016 and 2020, of the \$307M total "incremental work, above formal operation costs" of Pickering continued operations.

6.6-SEC-69

[F4/3/1] With respect to the Ontario Public Sector Salary Disclosure List:

- a. For each of 2014 and 2015, what percentages of OPG's employees were on the Ontario Public Sector Salary Disclosure List?
- b. Please discuss OPG's expectation regarding the trend of employees to be both on the list, and are on the list with salaries at or above \$200,000 in 2016 and throughout the test period.

6.6-SEC-70

[F4/3/1, p.8] OPG's current collective agreements with the PWU and the Society expire on March 31st 2017 (PWU) and December 31st 2018 (Society). Please provide the assumptions OPG is making for the purposes of the proposed test period budget, regarding the outcome of any further collective agreements for the period after their respective expiry dates and the end of the test period (December 31st 2021).

6.6-SEC-71

[F4/3/1, p.8] Please detail all changes that were made to the current collective agreement from the one filed in EB-2013-0321, as a result of the last round of bargaining between the PWU and the Society.

6.6-SEC-72

[F4/3/1, p.8] Please provide a breakdown of the cost impact (additional cost and/or savings) for each of the negotiated collective agreements with the PWU and the Society, for each of the following time periods: i) the term of the current collective agreement, ii) the test period, and iii) the total impact if the change extends beyond the test period. Please detail all assumptions made and the full calculations.

6.6-SEC-73

[F4/3/1, p.8] Did OPG receive any instructions from its shareholders regarding the negotiations of its most recent collective agreements? If so, please provide details, and copies of those instructions.

6.6-SEC-74

[F4/3/1, p.8] Please provide all documents, including but not limited to, strategies, proposals, memorandum, analysis, opinion and expert opinions, utilized during the negotiations of the last collective agreement with the PWU and the Society.

6.6-SEC-75

[F4/3/1, p.11] Is OPG's current executive compensation program in compliance with O. Reg. 304/16 made pursuant to the *Broader Public Sector Executive Compensation Act, 2014*? If so, please explain how. If not, please explain what changes are required and the expected cost impact.

6.6-SEC-76

[F4/3/1, p.12] With respect to any management employee's incentive plan:

- a. Is OPG still using the Annual Incentive Plan (AIP) for management incentive pay? If so, please provide details of the plan. If not, please explain the new program.
- b. Has the plan changed since 2012? If so, please explain how.
- c. Please provide a similar chart to that of Figure 10 on p.168 of the 2013 Annual Report of Office of Auditor General of Ontario, showing the distribution of AIP scores for Executive and Senior

Management (Bands A–F) and Below Executive and Senior Management (Bands G–L), for each year between 2013 and 2015.

- d. For each year between 2016 and 2021, what assumptions is OPG making regarding the distribution of its AIP scores for the purposes of its setting its budget.

6.6-SEC-77

[F4/3/1, p.16] OPG states that its negotiations with the PWU and Society were with “assistance of the Government”. Please explain the involvement of the Government in these negotiations?

6.6-SEC-78

[F4/3/1, p.17-18] Regarding the Share Performance Plan:

- a. How many FTEs in each year of the test period, for each of the Society and PWU, will be eligible for the Share Performance Plan?
- b. What is the total amount of compensation in each year of the test period, for each of the Society and PWU that is forecasted to be paid by way of Hydro One Inc. Shares?
- c. If the shares OPG purchases increase or decrease in price before they are paid to eligible employees, who bears the benefit (if the share price increases) and the cost (if the share price decreases) between OPG’s shareholder and ratepayer?
- d. What is the current value of OPG’s 9M Hydro One share? What is the variance from the value that it paid for those shares?

6.6-SEC-79

[Application Presentation, September 1, 2016, p. 21] Please recalculate the expected wages increases including the expected value of the shares of Hydro One. Please provide a detailed explanation of how the cost or value of the shares of Hydro One, and the value to the employees of the compensation they represent, is expected to be reflected in rates either in the period 2017-2021 or beyond. For greater certainty, and without limiting the generality of the foregoing, please ensure that any share compensation that will be reflected in the capital cost of assets, and any tax implications to OPG of the use of share compensation, is reflected in the answer.

6.6-SEC-80

[F4/3/1, p.19] Did OPG undertake a RFP process to select Willis Towers Watson to undertake the compensation benchmarking? If so, please provide a copy of the RFP. If not, please explain how Willis Towers Watson was selected.

6.6-SEC-81

[F4/3/1, Attach 1] Please provide a copy of the Attachment 1 in MS Excel format.

6.6-SEC-82

[F4/3/1, Attach 2] With respect to the Willis Towers Watson study:

- a. Please provide a chart showing the difference between the comparators used for each category (utility, nuclear, and general industry) in the Aon Hewitt study filed in EB-2013-0321, and the Willis Towers Watson study filed in evidence in this proceeding. Please explain any changes made.
- b. Please detail a methodological difference between the Willis Towers Watson study and the Aon Hewitt study filed in EB-2013-0321.

6.6-SEC-83

[F4/3/1, Attach 2] With respect to the Willis Towers Watson study:

- a. What percentage of OPG's employees, that are either directly assigned or allocated (at least in part) to the nuclear facilities, are in each of the Utility, Nuclear, or General Industry comparator category?
- b. For each employee category (PWU, Society, Mgmt Group, and Total), please provide the cost impact, for each year of the test period, if OPG was at the 50% median, for each comparator category (Utility, Nuclear, General Industry, Total). Please only include the cost impact as they relate to costs that are either directly attributable to or allocated to the nuclear facilities. Please provide all assumptions used in the calculation.

6.6-SEC-84

[F4/3/1, Attachment 3] With respect to the Willis Towers Watson Comparison of Salary Schedules for Society and PWU rules (OPG vs Bruce Power):

- a. Please confirm the weekly and yearly salaries for OPG employees are based on the band amount contained in the collective agreement, and not an average of actual base salary compensation paid to all employees in each OPG band?
- b. As of April 2015, for each OPG position listed, how many employees due to grandfather provisions in the collective agreements are paid above the maximum pay amount in their respective pay band?

6.6-SEC-85

[F4/3/2] With respect to the pension benefits:

- a. Please provide a detailed summary of the assumed returns for each asset class of the assets or forecast assets of the pension plans.
- b. Please provide the current investment guidelines for each plan including any expectations related to returns by asset class.
- c. If external investment managers or advisors have arrangements to invest components of the plan assets, please provide the contracts or other documents related to those arrangements that set out expected, forecast, or benchmark returns by asset class.

6.7-SEC-86

[F3/1/1] For each of the business units (functions) listed, please provide the forecast number of FTEs for 2017 (and each year between 2018 and 2021 if available).

6.7-SEC-87

[F3/1/1, Attach 1] With respect to the Hackett Group *Benchmarking Study of OPG's Corporate Information Support Functions and Costs* (April 2016):

- a. Please explain the selection process of the composite peer group.
- b. Please explain why Hackett believes they are appropriate.
- c. Please provide some background details regarding each of the peer group companies.

6.7-SEC-88

[F3/1/1, Attach 1] Please provide on the same basis as the Hackett Group Benchmarking Study, for each year 2017 and 2021, OPG's forecast:

- a. IT Cost Per End User.
- b. HR Cost per Employee.
- c. Finance Cost per Employee.
- d. ECS Cost as Percentage of Revenue.

7. OTHER REVENUES

7.1-SEC-89

[G2/1/2] Please explain the methodology OPG is using to forecast 2017-2021 nuclear non-energy revenues.

7.2-SEC-90

[G2/2/1] Please provide a detailed calculation, on a regulatory basis, and not on an accounting basis, of the OPG's return on equity on the Bruce nuclear assets, including actual for 2015, forecast for 2016, and budget for 2017. For the purposes of the calculation, please assume the debt and equity thicknesses applicable to the OPG, and the debt rates paid or expected to be paid by OPG in the respective periods. If assumptions are made with respect to the variable components of lease revenues, please provide details of those assumptions. Please exclude the impacts of derivative accounting on the calculations, including on the tax calculations.

8. NUCLEAR WASTE MANAGEMENT AND DECOMMISSIONING LIABILITIES

8.1-SEC-91

[C2/1/1, p.5] With respect to the Ontario Nuclear Fund Agreement:

- a. Please provide a copy of the Ontario Nuclear Funds Agreement.
- b. Please provide a copy of the current Ontario Nuclear Funds Agreement Reference Plan.
- c. What percentage funded is the Decommissioning Fund?
- d. What is the forecast percentage funded of the Decommissioning Fund for each year between 2017 and 2021?
- e. Please provide a copy of the latest financial statements of the segregated funds.

9. DEFERRAL AND VARIANCE ACCOUNTS

9.7-SEC-92

Please explain what OPG believes O. Reg 53/05 requires of the Board, and what aspects are a matter of discretion by the Board, with respect to any rate smoothing for nuclear facilities. Please explain the legal basis for OPG's position.

9.7-SEC-93

[Nuclear Rate Smoothing Proposal Presentation, September 23 2016, slides 5-6] Please provide similar charts (slides 5-6) and table (slide 5-6) showing the rate smoothing deferral account through the end of the deferral period (as defined in O. Reg 53/05) and the clearance period.

9.7-SEC-94

[Nuclear Rate Smoothing Proposal Presentation, September 23 2016, slide 7]

OPG states that it assessed the rate smoothing proposal against six criteria including its own financial viability, using two metrics, i) Debt-to-Earnings Before Interest Taxes Depreciation and Amortization ratio, and ii) Funds From Operations Adjusted Interest Coverage Ratio:

- a. Please provide details regarding the analysis undertaken and the results of metrics based on OPG's proposal.
- b. For each metric, please explain what is required to maintain financial viability.

11. METHODOLOGIES FOR SETTING PAYMENT AMOUNTS

11.1-SEC-95

SEC seeks to understand the interplay between the proposed rate-setting mechanism and the Hydroelectric Capacity Refurbishment Variance Account:

- a. Please provide a list of all planned capital projects and their costs that are expected to be in-service between 2017 and 2021 that would be subject to the Hydroelectric Capacity Refurbishment Variance Account.
- b. For each year between 2017 and 2021, please provide OPG's forecast total hydroelectric in-service additions.
- c. Please explain how OPG has taken into account the Hydroelectric Capacity Refurbishment Variance Account in its determination of the appropriate incentive rate-setting adjustment for hydroelectric payment amounts.

11.1-SEC-96

The attached spreadsheet sets out a simple calculation of the expected increases in costs from a capital-intensive business like hydroelectric power generation. It shows \$1 million of 50 year assets going into service in year one, with annual costs for cost of capital (debt, equity and taxes) of 8% and depreciation of 2%. OM&A is 15% of total annual costs (excluding gross revenue charge), and there are annual capital additions to replenish the original asset equal to depreciation plus the cumulative impact of inflation.

With respect to the cost drivers affecting a capital-intensive business like hydroelectric power generation:

- a. Please confirm that this pattern is an accurate, if simplified, description of the cost drivers on such a business over time. If it is not, please explain the primary ways in which it is incorrect.
- b. Please confirm that if both operating and capital costs increase at the rate of inflation every year, with zero productivity, the overall revenue requirement for the business will increase at an average of slightly more than 40% of inflation. Please confirm that this effect will decline (i.e. annual costs will get closer to inflation) as inflation- driven operating costs become a higher percentage of annual costs relative to capital, and will increase (i.e. annual costs will increase at a lower percentage of inflation) as those operating costs become a lower of percentage of annual costs relative to capital. Please confirm that annual costs can only be equal to or greater than inflation if:
 - i. Operating costs are 100% of annual costs, or
 - ii. Operating costs or capital costs rise significantly faster than inflation
- c. Please explain the primary factors causing the costs of the OPG to follow a pattern of increases that are not comparable to the standard cost drivers for capital intensive businesses.

11.1-SEC-97

Please provide a table showing, for each of the hydroelectric generating stations currently included in the prescribed facilities:

- a. The name and capacity of the facility.
- b. The original capital cost of the facility.
- c. The first year in-service.
- d. The original capital cost and capacity of any capacity additions to the facility (but not including any capital additions that did not add to capacity), and the date of the capacity addition.
- e. Any adjustments to net book value of the facility prior to 2016.

- f. The current net book value of the facility, net of all capital additions (not just those that add capacity) and all depreciation and other adjustments.

11.1-SEC-98

Please confirm that Hydro Quebec's cost to generate each kWh of electricity from hydroelectric sources has declined relative to inflation, and declined in absolute terms, for the last ten years. Please explain in detail the differences between the current and expected cost drivers for Hydro Quebec and OPG that justify annual inflationary increases for OPG, while such increases do not appear to be required for Hydro Quebec. The cost per kWh for Hydro Quebec in 2015-2016 is 2.08 cents, according to their most recent Cue Card financial results report. Please provide the comparably calculated cost per kwh. for the OPG, and explain the material factors making the OPG's cost for the same period higher than the Hydro Quebec cost.

11.1-SEC-99

[A1/3/2/ Attach 1, p.38] Please explain what steps were taken to verify that the data available for Canadian peers, even if not sufficiently granular to use in the study, was comparable to similar data available for the US peer group used, i.e. to demonstrate that the US peers are a reasonable proxy for the Canadian peer group. What were the results of that verification process? Please provide copies of all analyses that show that the US peers are comparable to the Canadian peers, and thus an appropriate proxy group.

11.1-SEC-100

[A1/3/2, p.19 and Attach. 1, p.48]

Please provide a detailed calculation, or equivalent narrative explanation, showing the basis for LEI's assertion that mature hydroelectric facilities should show negative productivity.

11.1-SEC-101

[A1/3/2, Attach. 1, p.42] Please explain why the output measures were not adjusted for hydrology to remove volatility. Please advise to what extent costs for a hydroelectric facility are independent of annual variations in hydrology.

11.1-SEC-102

Please provide a table showing the impact of timing differences on the tax consequences of the Niagara Tunnel for all years of its planned life. Please break out the CCA and depreciation amounts for each year, the annual and cumulative difference in UCC and net book value, and the annual and cumulative reduction in PILs arising out of the differences.

11.1-SEC-103

Please confirm that, assuming constant production, the gross revenue charge increases by the same percentage as the payments amounts for hydroelectric generation. Please confirm that, under the proposal from the OPG, the gross revenue charge would increase annually by the inflation factor, less the stretch factor.

Respectfully submitted on behalf of the School Energy Coalition this 3rd day of October, 2016.

Original signed by

Mark Rubenstein
Counsel for the School Energy Coalition

Annual Consumption Assumptions for Schools (From BPS Energy Reporting 2013 data)

	2011	2012	2013	2014	2015	2016 Total		2017	2018	2019	2020	2021 Total	2022	2023	2024	2025	2026 Total	Ten years
Smoothed Rates with no Riders																		
Nuclear	\$51.52	\$51.52	\$51.52	\$51.52	\$51.52	\$59.29		\$65.81	\$73.05	\$81.09	\$90.01	\$99.91		\$110.90	\$123.10	\$136.64	\$151.67	\$168.35
Dollars	\$32,779	\$32,779	\$32,779	\$32,779	\$32,779	\$37,723	\$168,839	\$41,871	\$46,477	\$51,593	\$57,268	\$63,567	\$260,776	\$70,559	\$78,321	\$86,936	\$96,499	\$107,111
% change		0.00%	0.00%	0.00%	0.00%	15.08%		11.00%	11.00%	11.00%	11.00%	11.00%		11.00%	11.00%	11.00%	11.00%	11.00%
Hydro	\$35.78	\$35.78	\$35.78	\$37.57	\$40.72	\$40.72		\$41.71	\$42.33	\$42.97	\$43.61	\$44.27		\$44.93	\$45.61	\$46.29	\$46.99	\$47.69
Dollars	\$15,545	\$15,545	\$15,545	\$16,323	\$17,692	\$17,692	\$82,797	\$18,122	\$18,391	\$18,669	\$18,947	\$19,234	\$93,364	\$19,523	\$19,815	\$20,113	\$20,414	\$20,721
% change		0.00%	0.00%	10.00%	8.38%	0.00%		2.43%	1.49%	1.51%	1.49%	1.51%		1.50%	1.50%	1.50%	1.50%	1.50%
Blended	\$45.13	\$45.13	\$45.13	\$45.86	\$47.14	\$51.75		\$56.03	\$60.58	\$65.62	\$71.18	\$77.33		\$84.13	\$91.66	\$99.98	\$109.19	\$119.39
Dollars	\$48,324	\$48,324	\$48,324	\$49,102	\$50,471	\$55,414	\$251,636	\$59,993	\$64,869	\$70,262	\$76,215	\$82,801	\$354,139	\$90,082	\$98,137	\$107,048	\$116,913	\$127,832
% change		0.00%	0.00%	1.61%	2.79%	9.79%		8.26%	8.13%	8.31%	8.47%	8.64%		8.79%	8.94%	9.08%	9.21%	9.34%
Increase	\$0	\$0	\$0	\$778	\$2,146	\$7,090	\$10,014	\$4,578	\$9,454	\$14,848	\$20,801	\$27,386	\$77,068	\$34,667	\$42,722	\$51,634	\$61,498	\$72,417

[illegible]

Nuclear Rider Total Dollars % change	\$59.29	\$65.81	\$73.05	\$81.09	\$90.01	\$99.91
Hydro Rider Total Dollars % change	\$40.72	\$41.71	\$42.33	\$42.97	\$43.61	\$44.27
Blended Rider Total Dollars % change	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Nuclear Rider Total Dollars % change	\$59.29	\$65.81	\$73.05	\$81.09	\$90.01	\$99.91
Hydro Rider Total	\$40.72	\$41.71	\$42.33	\$42.97	\$43.61	\$44.27

Dollars						
% change						
Blended						
Rider						
Total						
Dollars						
% change						

\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
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Capital intensive Business - Cost Drivers

Capital Cost	\$1,000,000
Depreciation	2% 50 year amortization
Cost of Capital	8% including debt, equity and taxes
Inflation	1.80% as proposed by OPG
Annual Capital	equal to depreciation plus cumulative inflation
Operating Costs	15% as a percentage of annual costs/rev.req
OM&A increase	1.80% equal to inflation

Year	0	1	2	3	4	5	6	7	8	9
Inflation Factor	0.000	1.018	1.036	1.055	1.074	1.093	1.113	1.133	1.153	1.174
Capital	\$1,000,000	\$1,000,000	\$1,020,360	\$1,041,086	\$1,062,186	\$1,083,665	\$1,105,531	\$1,127,791	\$1,150,451	\$1,173,519
Additions	0	\$20,360	\$20,726	\$21,100	\$21,479	\$21,866	\$22,260	\$22,660	\$23,068	\$23,483
Total Gross Capital	\$1,000,000	\$1,020,360	\$1,041,086	\$1,062,186	\$1,083,665	\$1,105,531	\$1,127,791	\$1,150,451	\$1,173,519	\$1,197,003
Capital increase		2.04%	2.03%	2.03%	2.02%	2.02%	2.01%	2.01%	2.01%	2.00%
Dep. Original	0	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
Dep. Additions		\$0	\$407	\$822	\$1,244	\$1,673	\$2,111	\$2,556	\$3,009	\$3,470
Dep. Current Add.		\$204	\$207	\$211	\$215	\$219	\$223	\$227	\$231	\$235
Total Depn.	0	\$20,204	\$20,614	\$21,033	\$21,459	\$21,892	\$22,333	\$22,782	\$23,240	\$23,705
Cum. Depreciation		\$20,204	\$40,818	\$61,851	\$83,309	\$105,201	\$127,534	\$150,317	\$173,557	\$197,262
Net Rate Base	\$1,000,000	\$1,000,156	\$1,000,268	\$1,000,335	\$1,000,356	\$1,000,330	\$1,000,256	\$1,000,134	\$999,963	\$999,741
Rate base increase		0.02%	0.01%	0.01%	0.00%	0.00%	-0.01%	-0.01%	-0.02%	-0.02%
Cost of Capital		\$80,013	\$80,021	\$80,027	\$80,028	\$80,026	\$80,021	\$80,011	\$79,997	\$79,979
Depreciation		\$20,204	\$20,614	\$21,033	\$21,459	\$21,892	\$22,333	\$22,782	\$23,240	\$23,705
RR - Capital		\$100,216	\$100,636	\$101,060	\$101,487	\$101,918	\$102,354	\$102,793	\$103,237	\$103,684
Operating Costs		\$17,685	\$18,004	\$18,328	\$18,657	\$18,993	\$19,335	\$19,683	\$20,038	\$20,398
Revenue Requirement		\$117,901	\$118,639	\$119,387	\$120,144	\$120,912	\$121,689	\$122,476	\$123,274	\$124,083
Increase			0.63%	0.63%	0.63%	0.64%	0.64%	0.65%	0.65%	0.66%
Percent of Inflation			34.8%	35.0%	35.2%	35.5%	35.7%	36.0%	36.2%	36.4%

10	11	12	13	14	15	16	17	18	19	20
1.195	1.217	1.239	1.261	1.284	1.307	1.330	1.354	1.379	1.403	1.429
\$1,197,003	\$1,220,909	\$1,245,245	\$1,270,019	\$1,295,240	\$1,320,914	\$1,347,051	\$1,373,657	\$1,400,743	\$1,428,317	\$1,456,386
\$23,906	\$24,336	\$24,774	\$25,220	\$25,674	\$26,136	\$26,607	\$27,086	\$27,573	\$28,070	\$28,575
\$1,220,909	\$1,245,245	\$1,270,019	\$1,295,240	\$1,320,914	\$1,347,051	\$1,373,657	\$1,400,743	\$1,428,317	\$1,456,386	\$1,484,961
2.00%	1.99%	1.99%	1.99%	1.98%	1.98%	1.98%	1.97%	1.97%	1.97%	1.96%
\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
\$3,940	\$4,418	\$4,905	\$5,400	\$5,905	\$6,418	\$6,941	\$7,473	\$8,015	\$8,566	\$9,128
\$239	\$243	\$248	\$252	\$257	\$261	\$266	\$271	\$276	\$281	\$286
\$24,179	\$24,662	\$25,153	\$25,653	\$26,162	\$26,680	\$27,207	\$27,744	\$28,291	\$28,847	\$29,413
\$221,441	\$246,102	\$271,255	\$296,908	\$323,069	\$349,749	\$376,956	\$404,700	\$432,991	\$461,838	\$491,251
\$999,468	\$999,143	\$998,764	\$998,332	\$997,845	\$997,302	\$996,701	\$996,043	\$995,326	\$994,549	\$993,710
-0.03%	-0.03%	-0.04%	-0.04%	-0.05%	-0.05%	-0.06%	-0.07%	-0.07%	-0.08%	-0.08%
\$79,957	\$79,931	\$79,901	\$79,867	\$79,828	\$79,784	\$79,736	\$79,683	\$79,626	\$79,564	\$79,497
\$24,179	\$24,662	\$25,153	\$25,653	\$26,162	\$26,680	\$27,207	\$27,744	\$28,291	\$28,847	\$29,413
\$104,137	\$104,593	\$105,054	\$105,519	\$105,989	\$106,464	\$106,943	\$107,427	\$107,917	\$108,411	\$108,910
\$20,765	\$21,139	\$21,520	\$21,907	\$22,301	\$22,703	\$23,111	\$23,527	\$23,951	\$24,382	\$24,821
\$124,902	\$125,732	\$126,573	\$127,426	\$128,290	\$129,167	\$130,055	\$130,955	\$131,868	\$132,793	\$133,731
0.66%	0.66%	0.67%	0.67%	0.68%	0.68%	0.69%	0.69%	0.70%	0.70%	0.71%
36.7%	36.9%	37.2%	37.4%	37.7%	37.9%	38.2%	38.5%	38.7%	39.0%	39.3%

21	22	23	24	25	26	27	28	29	30	31
1.454	1.481	1.507	1.534	1.562	1.590	1.619	1.648	1.678	1.708	1.739
\$1,484,961	\$1,514,051	\$1,543,664	\$1,573,810	\$1,604,498	\$1,635,739	\$1,667,542	\$1,699,918	\$1,732,877	\$1,766,428	\$1,800,584
\$29,089	\$29,613	\$30,146	\$30,689	\$31,241	\$31,803	\$32,376	\$32,959	\$33,552	\$34,156	\$34,771
\$1,514,051	\$1,543,664	\$1,573,810	\$1,604,498	\$1,635,739	\$1,667,542	\$1,699,918	\$1,732,877	\$1,766,428	\$1,800,584	\$1,835,355
1.96%	1.96%	1.95%	1.95%	1.95%	1.94%	1.94%	1.94%	1.94%	1.93%	1.93%
\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
\$9,699	\$10,281	\$10,873	\$11,476	\$12,090	\$12,715	\$13,351	\$13,998	\$14,658	\$15,329	\$16,012
\$291	\$296	\$301	\$307	\$312	\$318	\$324	\$330	\$336	\$342	\$348
\$29,990	\$30,577	\$31,175	\$31,783	\$32,402	\$33,033	\$33,675	\$34,328	\$34,993	\$35,670	\$36,359
\$521,241	\$551,818	\$582,993	\$614,776	\$647,179	\$680,211	\$713,886	\$748,214	\$783,207	\$818,877	\$855,236
\$992,809	\$991,845	\$990,816	\$989,722	\$988,560	\$987,331	\$986,032	\$984,663	\$983,221	\$981,707	\$980,118
-0.09%	-0.10%	-0.10%	-0.11%	-0.12%	-0.12%	-0.13%	-0.14%	-0.15%	-0.15%	-0.16%
\$79,425	\$79,348	\$79,265	\$79,178	\$79,085	\$78,986	\$78,883	\$78,773	\$78,658	\$78,537	\$78,409
\$29,990	\$30,577	\$31,175	\$31,783	\$32,402	\$33,033	\$33,675	\$34,328	\$34,993	\$35,670	\$36,359
\$109,415	\$109,925	\$110,440	\$110,961	\$111,487	\$112,019	\$112,557	\$113,101	\$113,651	\$114,207	\$114,769
\$25,268	\$25,723	\$26,186	\$26,657	\$27,137	\$27,625	\$28,122	\$28,629	\$29,144	\$29,668	\$30,203
\$134,683	\$135,647	\$136,626	\$137,618	\$138,624	\$139,644	\$140,680	\$141,730	\$142,795	\$143,875	\$144,971
0.71%	0.72%	0.72%	0.73%	0.73%	0.74%	0.74%	0.75%	0.75%	0.76%	0.76%
39.5%	39.8%	40.1%	40.3%	40.6%	40.9%	41.2%	41.5%	41.8%	42.0%	42.3%

32	33	34	35	36	37	38	39	40	41	42
1.770	1.802	1.834	1.867	1.901	1.935	1.970	2.005	2.041	2.078	2.115
\$1,835,355	\$1,870,751	\$1,906,785	\$1,943,467	\$1,980,809	\$2,018,824	\$2,057,522	\$2,096,918	\$2,137,022	\$2,177,849	\$2,219,410
\$35,396	\$36,034	\$36,682	\$37,342	\$38,015	\$38,699	\$39,395	\$40,105	\$40,826	\$41,561	\$42,309
\$1,870,751	\$1,906,785	\$1,943,467	\$1,980,809	\$2,018,824	\$2,057,522	\$2,096,918	\$2,137,022	\$2,177,849	\$2,219,410	\$2,261,719
1.93%	1.93%	1.92%	1.92%	1.92%	1.92%	1.91%	1.91%	1.91%	1.91%	1.91%
\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
\$16,707	\$17,415	\$18,136	\$18,869	\$19,616	\$20,376	\$21,150	\$21,938	\$22,740	\$23,557	\$24,388
\$354	\$360	\$367	\$373	\$380	\$387	\$394	\$401	\$408	\$416	\$423
\$37,061	\$37,775	\$38,503	\$39,243	\$39,996	\$40,763	\$41,544	\$42,339	\$43,149	\$43,973	\$44,811
\$892,298	\$930,073	\$968,575	\$1,007,818	\$1,047,814	\$1,088,578	\$1,130,122	\$1,172,462	\$1,215,610	\$1,259,583	\$1,304,394
\$978,453	\$976,712	\$974,891	\$972,991	\$971,009	\$968,945	\$966,796	\$964,561	\$962,238	\$959,827	\$957,325
-0.17%	-0.18%	-0.19%	-0.19%	-0.20%	-0.21%	-0.22%	-0.23%	-0.24%	-0.25%	-0.26%
\$78,276	\$78,137	\$77,991	\$77,839	\$77,681	\$77,516	\$77,344	\$77,165	\$76,979	\$76,786	\$76,586
\$37,061	\$37,775	\$38,503	\$39,243	\$39,996	\$40,763	\$41,544	\$42,339	\$43,149	\$43,973	\$44,811
\$115,337	\$115,912	\$116,494	\$117,082	\$117,677	\$118,279	\$118,888	\$119,504	\$120,128	\$120,759	\$121,397
\$30,746	\$31,300	\$31,863	\$32,437	\$33,020	\$33,615	\$34,220	\$34,836	\$35,463	\$36,101	\$36,751
\$146,084	\$147,212	\$148,357	\$149,519	\$150,697	\$151,894	\$153,108	\$154,340	\$155,591	\$156,860	\$158,148
0.77%	0.77%	0.78%	0.78%	0.79%	0.79%	0.80%	0.80%	0.81%	0.82%	0.82%
42.6%	42.9%	43.2%	43.5%	43.8%	44.1%	44.4%	44.7%	45.0%	45.3%	45.6%

43	44	45	46	47	48	49	50
2.154	2.192	2.232	2.272	2.313	2.354	2.397	2.440
\$2,261,719	\$2,304,790	\$2,348,637	\$2,393,272	\$2,438,711	\$2,484,968	\$2,532,057	\$2,579,994
\$43,071	\$43,846	\$44,635	\$45,439	\$46,257	\$47,089	\$47,937	\$48,800
\$2,304,790	\$2,348,637	\$2,393,272	\$2,438,711	\$2,484,968	\$2,532,057	\$2,579,994	\$2,628,794
1.90%	1.90%	1.90%	1.90%	1.90%	1.89%	1.89%	1.89%
\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
\$25,234	\$26,096	\$26,973	\$27,865	\$28,774	\$29,699	\$30,641	\$31,600
\$431	\$438	\$446	\$454	\$463	\$471	\$479	\$488
\$45,665	\$46,534	\$47,419	\$48,320	\$49,237	\$50,170	\$51,121	\$52,088
\$1,350,059	\$1,396,594	\$1,444,013	\$1,492,333	\$1,541,569	\$1,591,740	\$1,642,860	\$1,694,948
\$954,731	\$952,043	\$949,259	\$946,378	\$943,398	\$940,318	\$937,134	\$933,846
-0.27%	-0.28%	-0.29%	-0.30%	-0.31%	-0.33%	-0.34%	-0.35%
\$76,378	\$76,163	\$75,941	\$75,710	\$75,472	\$75,225	\$74,971	\$74,708
\$45,665	\$46,534	\$47,419	\$48,320	\$49,237	\$50,170	\$51,121	\$52,088
\$122,044	\$122,698	\$123,360	\$124,030	\$124,709	\$125,396	\$126,091	\$126,796
\$37,412	\$38,086	\$38,771	\$39,469	\$40,180	\$40,903	\$41,639	\$42,389
\$159,456	\$160,784	\$162,131	\$163,499	\$164,888	\$166,299	\$167,731	\$169,184
0.83%	0.83%	0.84%	0.84%	0.85%	0.86%	0.86%	0.87%
45.9%	46.3%	46.6%	46.9%	47.2%	47.5%	47.8%	48.2%