Assuming transfer of operations of all Newfoundland Hydro small hydro facilities 1 Q. 2 (termed the "Small Hydro Transfer to NP Option" hereafter in this set of questions), please: 3 a. Identify which of its plants Newfoundland Hydro considers as "small hydro" and 4 5 why such a designation is considered appropriate. b. If such designation does not include the Exploit units or Granite Canal, please 6 7 describe why. 8 9 10 a. In Hydro's research on the definition of small hydro, it has determined that there is no A. 11 internationally agreed to definition for a small hydro power development and what is 12 generally considered small hydro varies between countries. In the International Renewable Energy Agency (IRENA) working paper "Renewable Energy Technologies: 13 Cost Analysis Series", ¹ it is indicated that although there is no agreed definition, the 14 15 following bands are typical to describe the size of hydropower projects: 16 100 MW or more of capacity feeding into a large Large-hydro: 17 electricity grid; Medium-hydro: 20 MW to 100 MW almost always feeding a grid; 18 19 Small-hydro: 1 MW to 20 MW usually feeding into a grid; 20 Mini-hydro: 100 kW to 1 MW that can be either stand-alone, 21 mini-grid or grid-connected; and 22 Micro-hydro: From 5 kW to 100 kW that provide power for a small 23 community or rural industry in remote areas away from 24 the grid.

¹ Volume 1: Power Sector Issue 3/5, *Hydropower* (June 2012).

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Further, IRENA offers the following as typical small hydro designations in various countries:

Country / Region	Small Hydropower Definition
	(MW)
Brazil	≤ 30
Canada	< 50
China	≤ 50
European Union	≤ 20
India	≤ 25
Norway	≤ 10
Sweden	≤ 1.5
United States	5-100

Small hydropower plants are more likely to be run-of-river facilities than are large hydropower plants, but reservoir (storage) and run-of-river hydropower plants of all sizes utilise the same basic components and technologies.

Hydro considers the small plants at Venam's Bight, Snook's Arm, and Roddickton Plant as small hydro.² These plants are the only hydro facilities owned by Hydro not directly included in capacity assessments for operational as well as long term system planning purposes.

As the primary utility responsible for bulk electrical supply in the province, Hydro is required to plan for appropriate capacity and energy to serve its

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² According to IRENA definitions these would be considered as "mini" hydro.

1	customers. Appropriate planning in this regard includes decision making control
2	for various aspects of any hydro facility that is of a material contribution to the
3	Island Interconnected System:
4	i. If a unit is unplanned out of service, Hydro must decide if an immediate
5	response is required to return the unit to service, or if the unit can
6	remain out of service, as it relates to other system capabilities, such as
7	operating reserves;
8	ii. For planned out of service timing such as for annual maintenance or for
9	capital works, Hydro would consider when a unit can be taken out of
10	service in consideration of other planned or unplanned unit
11	requirements;
12	iii. For capacity contribution to the overall system, Hydro will monitor the
13	availability of a unit and determine the appropriate level of availability as
14	the system requires and make determinations about adequacy of the
15	availability. This determination is factored into required long term
16	decisions, such as improving or not improving on the availability of
17	generating units, as may or may not be cost justified.
18	iv. For the long term decision making of a unit, Hydro will monitor the unit
19	and its contribution, and decide on the cost justified long term
20	investments and eventual retirements, as is dictated by the system
21	planning requirements.
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23	For the small hydro units noted, Hydro does not regard these three small units
24	in its daily, annual or long term needs from a capacity contribution perspective.

Part a of Nalcor's response to PUB-NALCOR-238 describes how the generating units of material size with respect to contribution to the Island Interconnected System are considered in Hydro's daily, annual and long term decision making.
Hydro does not consider the Exploits facilities as small hydro. Exploits' capacity

output is a material contribution to the Island Interconnected System. While they contain multiple units, the Exploits facilities in Grand Falls and Bishops Falls as a whole are considered in Hydro's long term planning to jointly provide a firm contribution of 63 MW. The Exploits facilities have an installed capacity of over 90 MW. These assets are managed and planned long term as to provide this firm contribution. Further, a substantial portion of the flows that drive the Exploits facilities are controlled and originate from the large Red Indian Lake reservoir, a characteristic not usually inherent to small hydro which are typically run-of-river facilities and highly subject to seasonal variations in river flows. ³

Similarly, Hydro does not regard the 40 MW Granite Canal facility as small hydro. The output of the Granite Canal facility is a material contribution to the overall island system capacity. It is also supported by a larger multi-day reservoir and is not a run-of-river facility. Hydro plans and dispatches this plant on a daily, annual and long term basis, consistent with its dispatch of larger units.

Hydro also owns and operates the smaller eight MW Paradise River facility on the Burin Peninsula. This facility operates under run-of-river philosophy which, combined with its size, would fit the IRENA typical designation for small hydro

³ Approximately 50% of the water utilized by the Exploits facilities originates from controlled sources.

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1	(i.e., 1 MW to 20 MW usually feeding the grid). However, Hydro includes the
2	eight MW capacity for this plant in its short term (operational) and long term
3	(planning) capacity assessments as this output can be managed to be made
4	available during peak conditions.