Report to the Responsible Minister for the Qulliq Energy Corporation On:

The Major Project Permit Application Respecting the Iqaluit Main Plant Upgrade

Report 2011-02

March 11, 2011

THE UTILITY RATES REVIEW COUNCIL

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LIST OF ABBREVIATIONS

GRA	General Rate Application
QEC	Qulliq Energy Corporation
URRC	Utilities Rates Review Council
MW	Megawatts
KG	Kilograms
RFC	Required Firm Capacity

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1.0 BACKGROUND

Qulliq Energy Corporation (QEC), as a designated utility, is required pursuant to Section 18.1 of the Qulliq Energy Corporation Act (QEC Act), to seek approval from the responsible Minister prior to undertaking a major capital project. In this regard, Section 18.1 of the QEC Act provides as follows:

> Definition
> (1) In this section, "major capital project" means a capital project that has a total cost that exceeds $5,000,000.
>
> Major capital project
> (2) The Corporation shall not undertake, nor permit any of its subsidiaries to undertake, a major capital project unless it applies in advance to the Minister for an order giving permission for the project.
>
> Minister may seek advice
> (3) Before responding to an application for permission made under subsection (2), the Minister may seek the advice of the Utility Rates Review Council established under the *Utility Rates Review Council Act*.
>
> Corporation to provide information
> (4) The Corporation shall provide the Minister and the Utility Rates Review
> Council with any information necessary for the Minister to decide whether permission should be granted.
>
> What Minister may do
> (5) The Minister may
> (a) grant permission for undertaking the major capital project, with or
> without conditions; or
> (b) refuse permission.
>
> Order
> (6) Permission granted by the Minister under paragraph (5)(a) shall be in the form of an order."

On November 8, 2010 QEC applied to the responsible Minister for approval of a major capital project permit for the Iqaluit main power plant upgrade and capacity increase. QEC indicates the preliminary budget for the major capital project is $29.7 million. This cost estimate was later amended to $28.2 million in URRC QEC 4c.

By letter dated November 9, 2010 the responsible Minister, in turn, requested advice from the URRC with respect to QEC's Application.

2.0 PARTICULARS OF THE APPLICATION

QEC indicates the capacity increase and upgrades to the Iqaluit generating plant are required because of the need to replace certain aging units as well as to meet the capacity requirements of a growing system.

QEC indicates the 2009/10 peak system load was recorded at 9.45 MW, with a forecasted 2010/11 peak load of 9.71 MW. Under the Corporation's capacity planning criteria the generating capacity must be sufficient to meet the forecast peak load plus 10%, with the largest unit out of service. QEC states, based on its capacity planning criteria, the Iqaluit system is capacity constrained at forecast 2010/11 peak load levels.

The existing installed capacity and the firm capacity with the largest unit out of service, are as follows:

Existing Installed Capacity							
Unit	Make	Present Location	Capacity MW	Year Installed	Hours of Operation	Service Life (Hrs)	Forecast Replacement Date
G1	Wartsila 9R32	Main Plant	3.0	1993	83000	100000	2014
G2	Wartsila 12V32	Main Plant	4.3	2000	104000	135000	2021
G3	Wartsila 12V200	Main Plant	2.0	1996	56000	120000	2021
G4	CAT 3612	Main Plant	3.3	1992	92000	120000	2016
G5	EMD 645	Federal Plant	2.3	1974	86000	100000	2016
	Installed Capacity		14.9				
	Remove Largest Unit		-4.3				
	Firm capacity		10.6				
Source: Tables 3 & 9 of the Application							

QEC indicates the forecasted 2010/11 peak load of 9.71 MW gives a projected peak firm-index of 0.92 (9.71/10.6) for the 2010/11 period and indicates that generation capacity will be at a 92% load factor during this year's peak season with the largest unit out of service. QEC states, ideally the typical firm index should be 0.75 or below to strike a planning "comfort zone" between system load growth and available generation. In QEC's view the major concern would be the failure of any additional gensets and/or the ability of overcoming cold load pickup if a sustained outage were to occur during this time period. QEC states another scenario of concern would arise if there were a sustained fault on feeders #3 or #4. These feeders are tied into the Federal Plant and the system would lose an additional 2.3 MW of generation capacity from the Federal Plant bus, leaving the system unable to carry the peak load.

In order to address the capacity requirements and to replace the existing units that are to be retired at the end of their service life, QEC considered a number of alternatives:

Federal Plant Expansion: Under this option modifications to the G5 unit would be completed on site without the requirement of a complete genset relocation. A new G6 genset would be installed in the Federal plant facility and connected to the system via distribution feeders #3 and #4.

QEC indicates an independent civil and structural review was completed by Williams Engineering of Yellowknife and has concluded that the Federal building does not have the structural capacity for a proposed genset and substantial modifications would have to be made to the floor slab to accommodate a large unit weighing approximately 64,000 kilograms.

QEC did not consider the Federal plant expansion to be a viable option because the present Federal plant facility would need significant upgrades to address safety, building code and operational issues. Further, an additional substation would be required.

Emergency Standby Generation: This option would include the design, purchase and installation of a 12 MW to 15 MW turbine driven genset package at the main plant. QEC states, the use of a turbine, rather than a typical reciprocating engine driven generator, would considerably reduce the footprint of the unit, reduce installation cost and provide a significant amount of emergency capacity in the event of major engine trouble at either Iqaluit plant.

However, QEC did not consider this a viable option. QEC states a turbine unit is very inefficient and would negatively impact on fuel efficiency of the Iqaluit system resulting in excessive fuel consumption costs, if required for extended periods. QEC notes this option does not address the issue of firm capacity within the Iqaluit plant and represents only a short term solution to manage risk while exhibiting poor system planning. Within the next 3-5 years existing gensets will have to be replaced due to age, regardless of installed standby capacity, creating additional cost to QEC. QEC states this option also does not address any of the aging infrastructure issues at the main plant or the Federal plant.

Main Plant Expansion: QEC indicates the upgrade master plan, dated 2002, prepared by Gygax Engineering Associates Ltd identified a number of issues with the existing plant infrastructure and generating capacity and made recommendations to accommodate the changes required to meet future load growth and demand. Pursuant to this master plan, all gensets and supporting auxiliary systems would be consolidated at the main plant location. The key benefits of this option identified by QEC are as follows:

1. All gensets in one general arena serviced by the same resources (i.e. overhead crane, mechanical shop, stores, etc.) rather than the additional expense of duplicate equipment and services provided in another facility (e.g. Federal plant).
2. All auxiliary systems, including air (combustion, ventilation, tool, and starting), lubricating oil and glycol to be consolidated into bulk handling, storage and distribution systems. Building auxiliary systems to be cohesively planned and coordinated with heating, lighting and ventilation systems.
3. Preserves the option of utilizing residual heat by integrating the new generating equipment into the existing residual heat recovery system.

4. Proper system automation and supervisory control can be achieved.
5. Existing fuel system can be expanded to accommodate the new gensets.
6. The property can be properly fenced and the building exterior re-finished enhancing public safety, improving appearance and functionality of administrative areas and giving a clear aesthetic statement for the facility as a whole, given its prominent location overlooking the city.
7. Reduced operating costs by utilizing lower cost fuel at the main plant.

QEC states a further economic saving can also be recognized through the removal and decommissioning of the EMD unit from the Federal plant and suspend trucked fuel delivery operations.

Within the main plant expansion option QEC looked at two sub options (Option 1 and Option 2).

Main Plant Expansion, Option 1: This option would see the main plant expanded by two engine bays, as per the upgrade master plan report, installation of two 5.2 MW units, as well as all necessary building system upgrades and ancillary system improvements. The estimated cost of Option 1, after adjustment for residual heat allocation, is $28.2 million. QEC indicates the cost of expansion under Option 1 will be added to rate base in the 2013/14 fiscal year.[URRC QEC 4c) Revised Appendix D]

Under Option 1, the G5 unit located in the Federal plant would be retired effective 2013/14. The retirement of the G5 (2.3MW) unit and the addition of the two 5.2MW units would result in a net increase in the installed capacity from 14.9MW to 23MW in 2013/14.

QEC states the decommissioning of the G5 unit would also allow greater serviceability and utilization, thus raising the efficiency of the plant. Currently the unit is restricted by its location and configuration at the Federal Plant and cannot be fully loaded to its continuous rating due to an undersized alternator.

Main Plant Expansion, Option 2: The scope of this option would be similar to Option 1 with two additional engine bays added to the main plant. However, each bay addition and the corresponding engine additions, will be staged. The first stage, to be completed in 2012/13, will see the addition to rate base of one engine bay together with a 5.2MW genset, at a total cost of $18.055 million; the second stage to be completed in 2017/18 will see the addition to rate base of the second engine bay together with a second 5.2MW genset, at a total cost of $12.956 million. [URRC QEC 6c) Attachment 1 Revised Attachment E]

The G5 EMD unit at the Federal building would be decommissioned in 2015/16. [URRC QEC 2c) Attachment 1]

QEC recommends Option 1 since, in QEC's view, Option 1 offers the least impact on rates and the least cost to the project, while enabling QEC to provide a continuous, safe and reliable power supply to ratepayers.

3.0 PROCESS

3.1 MAJOR OR MINOR APPLICATION

Under the URRC Act, it is directed that at the sole discretion of the URRC, the URRC shall determine whether an Application is either Minor or Major. In the case of the Iqaluit plant upgrade application, the URRC determines that this major project permit application is a Major application. Factors taken into consideration were:

1. The capital required for the project is $28.2 million.

2. In conjunction with General Rate Application Phase 1, a unique opportunity was provided to solicit the views of the public on the major project permit application. Therefore, simultaneous public meetings were able to be conducted in several communities.

3.2 PUBLIC CONSULTATION PROCESS

By letter dated November 25, 2010 the URRC notified the City of Iqaluit respecting the Application. The URRC also caused notice of the Application to be published in newspapers having general circulation in Nunavut for the month of December 2010.

Furthermore, the public consultation meetings conducted as part of the 2010/11 General Rate Application Phase 1, QEC made power point presentations respecting the Iqaluit main plant upgrade and capacity increase in support of the major project permit application. The public consultation meetings were held in the month of January 2011 on the following dates and at the indicated locations:

Date	Community	Time	Meeting Place
6-Jan-2011	Iqaluit	7:00 p.m.	Parish Hall
7-Jan-2011	Iqaluit	2:30 p.m.	Parish Hall
10-Jan-2011	Pangnirtung	7:00 p.m.	Community Center
11-Jan-2011	Apex (Iqaluit)	7:00 p.m.	Apex Abe Okpik Hall
12-Jan-2011	Chesterfield Inlet	7:00 p.m.	Council Chambers
13-Jan-2011	Rankin Inlet	2:30 p.m. & 7 p.m.	Arena
18-Jan-2011	Cambridge Bay	7 p.m.	Community Hall

The public was provided an opportunity to comment on the major project permit application at the conclusion of each meeting. The URRC also provided an opportunity for the public to make written comments respecting the major project permit application by February 11, 2011. No written submissions or comments were received from the public or any other party with respect to the Application by that date.

QEC responded to information requests from the URRC on January 10, 2011.

4.0 URRC FINDINGS

Based on the information provided in URRC QEC 2c) Attachment 1, the URRC notes the net present value of bill increases (net present value of bill increases shown in the last column of Attachment 1, discounted at QEC's average weighted cost of capital) would be somewhat greater under Option 1 as opposed to Option 2. The URRC also notes under Option 1 there would be significant surplus capacity at least for years 2013/14 and 2014/15 as shown below:

Option 1-Capacity Additions, Required Firm Capacity (RFC) and Surplus				
		Capacity	**RFC**	**Surplus**
		MW	**MW**	**MW**
2012/13	Existing	14.9		
2013/14	Replace G5 (2.3MW) and add 2 new sets G5 and G6, 5.2 MW each	23.0	16.9	6.1
2014/15	No change	23.0	17.2	5.8
2015/16	Decommission G4 (3.3 MW)	19.7	17.5	2.2
2016/17	No change	19.7	17.8	1.9
2017/18	No change	19.7	18.1	1.6
2018/19	No change	19.7	18.4	1.3
2019/20	Replace G2 (4.3MW) and G3 (2MW) with 5MW and 3 MW units	21.4	18.7	2.7
2020/21	No change	21.4	19.0	2.4
2021/22	No change	21.4	19.4	2.0
2022/23	No change	21.4	19.7	1.7
2023/24	No change	21.4	20.1	1.3
2024/25	No change	21.4	20.4	1.0
Source URRC QEC 2c				

Option 2 on the other hand would result in a staged increase in the installed capacity of the plant. However, Option 2 which contemplates addition of the second 5.2 MW unit in 2017/18 may mean postponing the retirement of G4 to 2017/18 when QEC indicates the second 5.2MW unit would be added, together with the addition of the second bay at the main plant.

A staged addition to capacity at the main plant would result in a more gradual increase in the rates under Option 2 as compared with Option 1, as shown below:

Estimated Rate Impact of Iqaluit Main Plant Upgrade Under Option 1				
Year	**Iqaluit Existing Energy Rate- Pre 2010/11 GRA**	**Increase Due to Main Plant Upgrade Option 1**	**Energy Rate After Increase**	**Percent Increase (Decrease) Yr over Yr**
A	**B**	**C**	**D=B+C**	**E**
2012/13	39.39		39.39	0.0%
2013/14	39.39	2.40	41.79	6.1%
2014/15	39.39	4.64	44.03	5.4%
2015/16	39.39	4.43	43.82	-0.5%
2016/17	39.39	4.23	43.62	-0.5%
2017/18	39.39	4.04	43.43	-0.4%
2018/19	39.39	3.85	43.24	-0.4%
2019/20	39.39	3.67	43.06	-0.4%
2020/21	39.39	3.50	42.89	-0.4%
2021/22	39.39	3.34	42.73	-0.4%
2022/23	39.39	3.18	42.57	-0.4%
2023/24	39.39	3.02	42.41	-0.4%
2024/25	39.39	2.87	42.26	-0.4%
Source: URRC QEC 2c) Attachment 1				

Estimated Rate Impact of Iqaluit Main Plant Upgrade Under Option 2				
Year	**Iqaluit Existing Energy Rate- Pre 2010/11 GRA**	**Increase Due to Main Plant Upgrade Option 2**	**Energy Rate After Increase**	**Percent Increase (Decrease) Yr over Yr**
A	**B**	**C**	**D=B+C**	**E**
2012/13	39.39		39.39	0.0%
2013/14	39.39	1.54	40.93	3.9%
2014/15	39.39	2.97	42.36	3.5%
2015/16	39.39	2.84	42.23	-0.3%
2016/17	39.39	2.71	42.10	-0.3%
2017/18	39.39	3.59	42.98	2.1%
2018/19	39.39	4.40	43.79	1.9%
2019/20	39.39	4.20	43.59	-0.5%
2020/21	39.39	4.01	43.40	-0.4%
2021/22	39.39	3.82	43.21	-0.4%
2022/23	39.39	3.64	43.03	-0.4%
2023/24	39.39	3.47	42.86	-0.4%
2024/25	39.39	3.30	42.69	-0.4%
Source: URRC QEC 2c) Attachment 1				

The URRC considers, a staged option such as Option 2 may allow greater flexibility in terms of responding to new information on the potential for alternative energy resources to meet QEC's requirements.

Notwithstanding the foregoing, the URRC recognizes there are many variables that can change the estimates for net present value and customer impacts made by QEC, at this time, arising from changes in the relative costs of both options and the timing of Option 2. For example, QEC used an inflation estimate of 2% per annum. The actual inflation rate may not necessarily correspond to the 2% assumption and this may change the net present value estimates. In addition to inflation, other cost changes may alter the cost differentials between Options 1 and 2. Also, the addition of the second bay and associated generating unit, under Option 2, may have to be advanced if the existing G4 unit needs to be replaced in 2016/17 as planned. Postponing the retirement of the EMD unit (G5) located at the Federal plant entails additional costs for trucking fuel to that plant.

Given the evidence in this proceeding, the URRC considers that QEC has clearly demonstrated that there is a need for the requested upgrades and capacity additions and accepts QEC's analysis and proposal for the main plant expansion, as per the upgrade master plan report.

With respect to the choice between Options 1 and 2, the URRC considers this to be essentially a management decision. The decision on a prudent choice between Options 1 and 2 or variations thereof will clearly be informed by new information pertaining to the project as QEC proceeds with the planning and execution of the project. URRC considers QEC should be able to demonstrate the prudence of its choices respecting the timing of capital additions at the time it proposes to add the cost of the project to rate base. In demonstrating prudence, QEC will be expected to demonstrate that QEC chose the least cost option that is consistent with maintaining system reliability while maintaining stability of rates.

5.0 URRC RECOMMENDATION

1. Having considered the foregoing matters, the URRC recommends that the major capital project permit approval be granted for the Iqaluit main power plant upgrade and capacity increase.

ON BEHALF OF THE

UTILITY RATES REVIEW COUNCIL OF NUNAVUT

DATED: March 11, 2011

Raymond Mercer

Chairperson