

IMO Staff Recommendation to Panel on Exemption Application (General)

All information submitted in this process will be used by the *IMO* solely in support of its obligations under the "Electricity Act, 1998", the "Ontario Energy Board Act, 1998", the "Market Rules" and associated policies, standards and procedures and its licence. All submitted information will be assigned the appropriate confidentiality level upon receipt.

1. Terms and acronyms used in this Form that are italicized have the meanings ascribed thereto in Chapter 11 of the "Market Rules".

PART 1 – GENERAL INFORMATION

Market Participant Name: **Brighton Beach Power Limited**

Location/Site: Brighton Beach combined-cycle facility

Exemption Application ID: **1303**

Market Participant ID:

Description of Exemption Requested: An *exemption* is requested from the requirement to provide normal speed governing action on the steam turbine at the Brighton Beach combined-cycle facility.

Date Exemption Application Received: February 27, 2004

Date all relevant application information supplied by exemption applicant: April 1, 2004

Management Approvals Obtained: ☒ Yes ☐ No

Are there any outstanding disputes, compliance actions, or pending *market rule* amendments involving the subject matter of this *exemption application*? ☐ Yes ☒ No

Are there any outstanding disputes, compliance actions, or pending *market rule* amendments involving the *exemption applicant*? ☐ Yes ☒ No

Section of the *Exemption Application* and Assessment Procedure under which the *exemption application* is made:

- Section 1.4.1 "Application for Exemption – General"

Market Rule(s) or related Market Manual(s) from which exemption is requested (copy of Market Rule(s) or Market Manual(s) attached): *Market Rules*, Chapter 4, Appendix 4.2, Reference 16.

Third Party Submissions Received: ☐ Yes ☐ No

Supplemental Assessment Information Attached: ☐ Yes ☒ No

Exemption Applicant Compliance Plan

Related Historical Exemption Application(s) or Related Exemption Application(s) in Process:

☒ Yes ☐ No

PART 1 – GENERAL INFORMATION

Note: If YES, list History of *Exemption Applications*:

1015, 1023, 1035 and 1057

Role of *exemption applicant* in the market as it relates to this *exemption application*: *Generator*

PART 2 – RECOMMENDATION

Recommendation: GRANTED with conditions

Criteria Used in Assessment of General Exemption Applications (Section 1.4.2 of Exemption Application and Assessment Procedure):

(If X appears in a box, the criterion is applicable to this *exemption application* and is evaluated in Part 3 - Details of Assessment; if X does not appear in a box, the criterion is not applicable to this *exemption application*.)

Whether the *exemption* that is the subject-matter of the *exemption application* would, if granted, materially:

- impact the ability of the *IMO* to direct the operations and maintain the *reliability* of the *IMO-controlled grid*; ☒
- See Part 3 – "Details of Assessment" section.
- Impact the ability of the *IMO* to ensure non-discriminatory access to the *IMO-controlled grid*; ☐
- Affect the ability of the *IMO* to operate the *IMO-administered markets* in an efficient, competitive, and reliable manner; ☐
- Increase costs of *market participants*; or ☐
- Increase costs of the *IMO*; ☐

Whether the *exemption* that is the subject-matter of the *exemption application* would, if granted, give the *exemption applicant* an undue preference in the *IMO-administered markets*; ☐

PART 2 – RECOMMENDATION

Whether the cost or delay to the *exemption applicant* of complying with the obligation or standard to which the *exemption application* relates is reasonable, having regard to the nature of the obligation or standard, the nature of the *exemption application* and the anticipated impact of non-compliance by the *exemption applicant* in terms of the elements referred to above; ☒

The *exemption applicant* cited significant cost impacts for them of the *exemption* not being granted in Attachment #1, “Brighton Beach Frequency Response Exemption Impact Assessment” of their *exemption application*. For more details, see Part 3 – “Details of Assessment” section.

The adequacy of the *exemption* plan submitted by the *exemption applicant*; ☐

Where the *exemption applicant* is the *IMO*, the identification of the benefit to *market participants* of compliance with the obligation or standard relative to the financial and other resources required to achieve compliance within such deadlines as may be applicable; ☐

Where the *exemption applicant* is the *IMO*, the manner in which it proposes to operate in the *IMO-administered markets* or direct the operations and maintain the *reliability* of the *IMO-controlled grid* during the period in which the *exemption* would be in effect; ☐

Whether the *facility* or equipment that is the subject-matter of the *exemption application*:

- was in service or was returned to service on the date on which the obligation or standard to which the *exemption application* relates came into force; ☐
- was ordered by the *exemption applicant* on or prior to the date on which the obligation or standard to which the *exemption application* relates came into force; or ☐
- was in the process of construction on or prior to the date on which the obligation or standard to which the *exemption application* relates came into force; and ☐

The capability of the owner of the *facility* to operate the *facility* consistent with the terms of the proposed *exemption*. ☒

The *facility* owner is capable of operating the *facility* consistent with the terms of the proposed *exemption*.

PART 3 – DETAILS OF ASSESSMENT

Exemption Request:

An *exemption* is requested from the requirement to provide normal speed governing action on the single steam turbine at the Brighton Beach combined-cycle facility.

Market Rule Requirement:

Chapter 4, Reference 16 of Appendix 4.2 of the "Market Rules" requires that each synchronous *generation unit* with a nameplate rating of greater than 10 MVA shall be operated with a speed governor.

Assessment:

Brighton Beach is currently commissioning their combined-cycle *facility* consisting of two 234 MVA gas turbine-*generation units* and a single 265 MVA steam turbine-*generation unit*. Exhaust from the two gas turbines feeds the steam turbine boiler.

It is intended to operate the station with the steam inlet valves of the steam turbine normally wide open. This is a common and desirable operating mode for combined-cycle plants.

Speed governors are used on *generation facilities* to keep their speed constant at a desired generation output, and to allocate generation output changes among the system's various units to achieve desired system frequency.

Speed governors automatically vary the *generation facility's* output for changes in system frequency (speed); e.g. cruise control - when the engine slows, the decrease in speed is detected and more fuel is automatically applied.

Controlling speed, and thus frequency, is important to maintain *reliability* of the *IMO-controlled grid*, and to protect the *generation facilities*.

The speed droop describes the *generation unit's* (governor's) sensitivity to frequency changes. A 5% droop means a 5% change in frequency will give a power change of 100% of the unit's rated output. 5% droop is used as the minimum requirement in Ontario. [A value less than 5% (e.g. as low as 3%) provides greater power change per change in frequency and exceeds the requirement.]

For a decrease in *electricity system* frequency, with the steam inlet valves wide open, the Brighton Beach steam turbine-*generation unit* cannot provide any controlled governor droop frequency response (i.e. the steam governor cannot increase *generation unit* output to correct for the decrease in system frequency). There is not enough steam.

For an increase in *electricity system* frequency, the governor can close the steam inlet valves. But this will produce steam pressure disturbances that could knock the generation facility offline. The *exemption applicant* proposes steam governor response only above 60.2 Hz.

Thus, the steam turbine-*generation unit* effectively would not operate with a speed governor.

Compliance Plan

The *exemption applicant* proposes to utilize a frequency compensating signal in the generation facility's load controller, also known as the 'block load controller', that would adjust the gas turbine-*generation units* to deliver an overall station 5% droop response. Load controllers apply or stage output changes to *generation units* based on *dispatch instructions*, and factor in ramp rates, temperatures and other production parameters. They are akin to a car driver accelerating or decelerating with a speed limit change, after which the cruise control (i.e. the governor) alone

PART 3 – DETAILS OF ASSESSMENT

controls the speed. However, load controllers intentionally change the power output of the plant's *generation units*, not the speed. *Electricity system* coordination makes other adjustments to maintain desired system frequency (speed). Thus, the load controller will automatically adjust the gas turbine-*generation unit* outputs to compensate for any lack of response from the steam turbine for an overall 5% droop.

The *IMO* has reviewed the *exemption applicant* proposal details and simulation data and performed some of its own simulations with the conclusion that the station's frequency compensating load controller design meets the intent of the *market rule* speed governor requirements, though not via a speed governor on the steam unit. *IMO* staff accept that this alternate *facility* speed governor control plan will not adversely affect the operation or *reliability* of the *IMO-controlled grid* as system frequency variations can safely be controlled. Also, this application points to the issue of whether the *market rules* should be amended to satisfy frequency control requirements on a *facility* basis and not only with individual *generation unit* speed governors. The *IMO* is currently contemplating such amendments, but resource priorities prevent the *IMO* from completing this in the commissioning timeframe for this applicant and in the near future. With these amendments, the Brighton Beach *facility* would be compliant. A *facility* frequency response allows the Brighton Beach *facility* to operate at acceptable low steam temperature limits and turbine exhaust temperature, ensuring the steam turbine remains on-line, and to uphold environmental standards.

Cost of Compliance

Potentially, there is a minimal incremental cost to *IMO* of monitoring compliance with the plan and no cost to other *market participants*. There is no additional cost to Brighton Beach as the load controller is already designed with a frequency-compensating signal. Brighton Beach indicates they would incur significant costs for capital investment in new controls, delays or production restrictions while commissioning new controls and ongoing plant operation at sub-optimal efficiencies if they were not granted the exemption. *IMO* believes these costs are unjustified when the alternative is cost effectively providing a sufficient result to meet the intent of the *market rules*. Therefore, *IMO* staff recommends that the speed governor control through the proposed compliance plan is acceptable, eliminating costly installation of new controls.

Recommendation:

It is recommended that the *exemption application* be GRANTED from the requirement to provide normal speed governing action on the steam turbine for the life of the equipment with the following conditions to achieve effective droop:

1. In coordination with the *IMO*, the governors on the gas turbine units shall be set no higher than 4% droop. This affords better initial response. The block load controller shall be set no higher than 5% droop.
2. In coordination with the *IMO*, the block load controller performance signal will be tested, reported and assessed as part of commissioning to ensure the frequency response meets the requirement.
3. The block load controller ramp rate shall be at least 12 MW/minute with all units in service.

PART 4 – TERMS AND CONDITIONS

Effective Date of Exemption (or event causing <i>exemption</i> to become effective)	February 27, 2004
Date of Expiration of Exemption <ul style="list-style-type: none"> If greater than 5 years, the Panel must be satisfied that the circumstances justify a later date. Circumstances which will cause the <i>exemption</i> to immediately expire. 	1. For the life of the equipment.
Market Rule(s) or related Market Manual(s) from which the Exemption is granted	Chapter 4, Appendix 4.2, Reference 16 - Speed Governor requirements
Restrictions on the manner of operation and/or additional obligations to be met during the term of the Exemption, if any	To achieve effective droop on an aggregated plant (<i>facility</i>) basis: <ol style="list-style-type: none"> In coordination with the <i>IMO</i>, the governors on the gas turbine units shall be set no higher than 4% droop. This affords better initial response. The block load controller shall be set no higher than 5% droop. In coordination with the <i>IMO</i>, the block load controller performance signal will be tested, reported and assessed as part of commissioning to ensure the frequency response meets the requirement. The block load controller ramp rate shall be at least 12 MW/minute with all units in service.
Monitoring Information Required Information required to be provided by the <i>exemption applicant</i> for monitoring by the <i>IMO</i> .	Commissioning Report
Payment of Costs <ul style="list-style-type: none"> Processing Costs (when introduced) Incremental Exemption Costs <i>Settlement amounts</i> to be withheld or repaid. 	N/A
Reconsideration/Removal <ul style="list-style-type: none"> Date on which the <i>exemption</i> will be reconsidered (if applicable). 	N/A

PART 4 – TERMS AND CONDITIONS

<ul style="list-style-type: none"> • Circumstances under which the <i>exemption</i> will be reconsidered (if applicable) other than unforeseen future change in circumstances. 	
<p>Transferability</p> <ul style="list-style-type: none"> • List the terms and conditions that need to be met to allow for a transfer of this <i>exemption</i> to be approved by <i>IMO</i> staff. 	<p>Approval to transfer this exemption may occur once the following criteria have been met:</p> <ul style="list-style-type: none"> • the transfer meets applicable terms and conditions set forth in the <i>exemption</i> itself and whether the transfer would affect the ability of the proposed transferee to comply with all of the terms and conditions of the <i>exemption</i>; • the proposed transferee is a <i>market participant</i> or undertakes in writing to the <i>IMO</i> to apply for authorization as a <i>market participant</i>; and • the extent to which the transfer of the <i>exemption</i> will impact the timely implementation of the plan to become compliant with the exempted obligation (such plan may be the <i>exemption</i> plan, modified as required by the Panel as part of the terms and conditions of the <i>exemption</i>).
<p>Other:</p>	<p>N/A</p>