

18th June 2015

Mr Tim Street
General Manager – Wholesale Market
Electricity Authority

By email to info@ea.govt.nz

Greetings Tim,

Application for Industrial Co-generator Type B Status:

CHH Pulp and Paper are making this application under the 16th February 2015 gazetted amendments for Industrial Co-generation Dispatch Arrangements, under schedule 13.4 of the EIPC 2010 that comes into force on the 27th May 2015, we seek Type B Co-generator Status for the Kinleith Pulp and Paper Mill Turbine Generator (single 41 MVA unit).

The Kinleith Turbine Generator is already classed as an industrial co-generating station under the EIPC prior to the recent amendments. It is an Allen Steam Turbines Ltd non-condensing type installed in 1998. The Kinleith Mill is an integrated Pulp and Paper Mill where the turbine is fuelled by steam generated for process use throughout the site.

There is no seasonal variation in operation, apart from the scheduled annual maintenance shut normally in September. It acts as a reducing station to control the pressure of the steam to make it suitable for process use through the mill, as such electricity is a by-product and it is tightly coupled to the industrial processes.

Reclassification as a Type B cogenerator station will allow CHH to respond to mill plant upsets while improving compliance with the Code and improve the ability of the System Operator to model the Kinleith generator in their dispatch schedule by relying on the real time output of the generator rather than manual updates from CHH Operations of estimated generation output. Refer Appendix A and B for supporting information and the attached excel file (*Kinleith Cogen Data Sets*), which shows the Kinleith generator variability under a number of scenarios.

Yours sincerely

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Appendix A – Summary of initial Code Change Application (30th November 2012)

Some electricity generators cannot meet the requirements of subpart 1 of Part 13 (Bids and Offers) due to the unpredictability of the primary energy source that is converted into electricity. This was recognised in 2004 by the Electricity Commission when the definition of **intermittent generating station** was introduced into the Electricity Governance Rules (2003) (Rules) to allow the Te Apiti wind farm to connect and operate in a manner compliant with the Rules.

A key issue for some electricity generators is that electricity output from co-generation plant may increase (in addition to decreases) unpredictably within the 2 hours immediately prior to a trading period, due to industrial process conditions changing.

An example of this is the co-generation facility at Carter Holt Harvey's Kinleith pulp and paper mill. The turbine is fuelled by steam generated for process use throughout the site. The turbine acts as a reducing station to control the pressure of the steam to make it suitable for process use throughout the mill; electricity is a by-product. As such the co-generation plant is coupled tightly to the industrial process.

Carter Holt Harvey understands that the System Operator considers that the Code (clause 13.204 (2)) prevents Carter Holt Harvey from revising dispatch instructions upwards within the 2 hour period for **unoffered generation**. The system operator has interpreted **unoffered generation** to include unpredicted increases in co-generation output. This means that, under these circumstances where co-generation output exceeds the dispatch instruction, clause 13.82 is breached.

Potential and existing generators additional to wind may require the ability to be treated similarly to intermittent generating stations, as they face similar unpredictability in their primary energy source, which could cause them to exceed dispatch instructions due to an unexpected increase in their primary energy source. These generators include solar, wave and some industrial process co-generators. The definition of intermittent generating station as exclusively wind generating stations presents a barrier to entry for generators that are reliant on unpredictable and/or volatile primary energy sources.

Currently the Kinleith co-generation plant, in times of volatile industrial manufacturing processes, cannot meet the offer requirements for a generator under subpart 1 of Part 13 (Bids and Offers). This situation is an inherent feature of the co-generation plant. During ramping of production sudden loss of loading can result occur, such events are unpredictable and because of this co-generation can be considered to have a similar characteristic to renewables such as wind and solar.

This situation has been known to the Electricity Commission and Electricity Authority since 2004. However it was considered at that time that the bona fide reasons provisions would allow management of short term ramp up deviations from dispatch instructions.

However despite CHH's best efforts (including significant improvements to monitoring and communications) the fundamental nature and configuration of the Kinleith generator and co-located industrial processes mean CHH has regularly been in breach of the code, resulting in a number of non-compliance investigations by the EA.

Appendix B: Kinleith Generation - Operational Description

Generation station that is reliant on a co-located industrial process because;

(a) it derives it's fuel source from that co-located industrial process;

Kinleith Mill is a large industrial site, producing Pulp and Paper. It has multiple steam using processes and the variation in these processes leads to significant variation in generation output from the non-condensing turbine that acts as a pressure reducing station. Plant changes leads to both decreases and increases in generation. It is connected via lines company Powerco 11kV network to the national Grid through the Kinleith Substation.

The turbine is a 41 MVA non-condensing type that reduces 4500 kPa steam generated from Kinleith site boilers to both 1250 kPa and 450 kPa for process use on site. Figure 1 below shows a diagram of our steam distribution system. Note the Turbine acts as the central pressure control station.

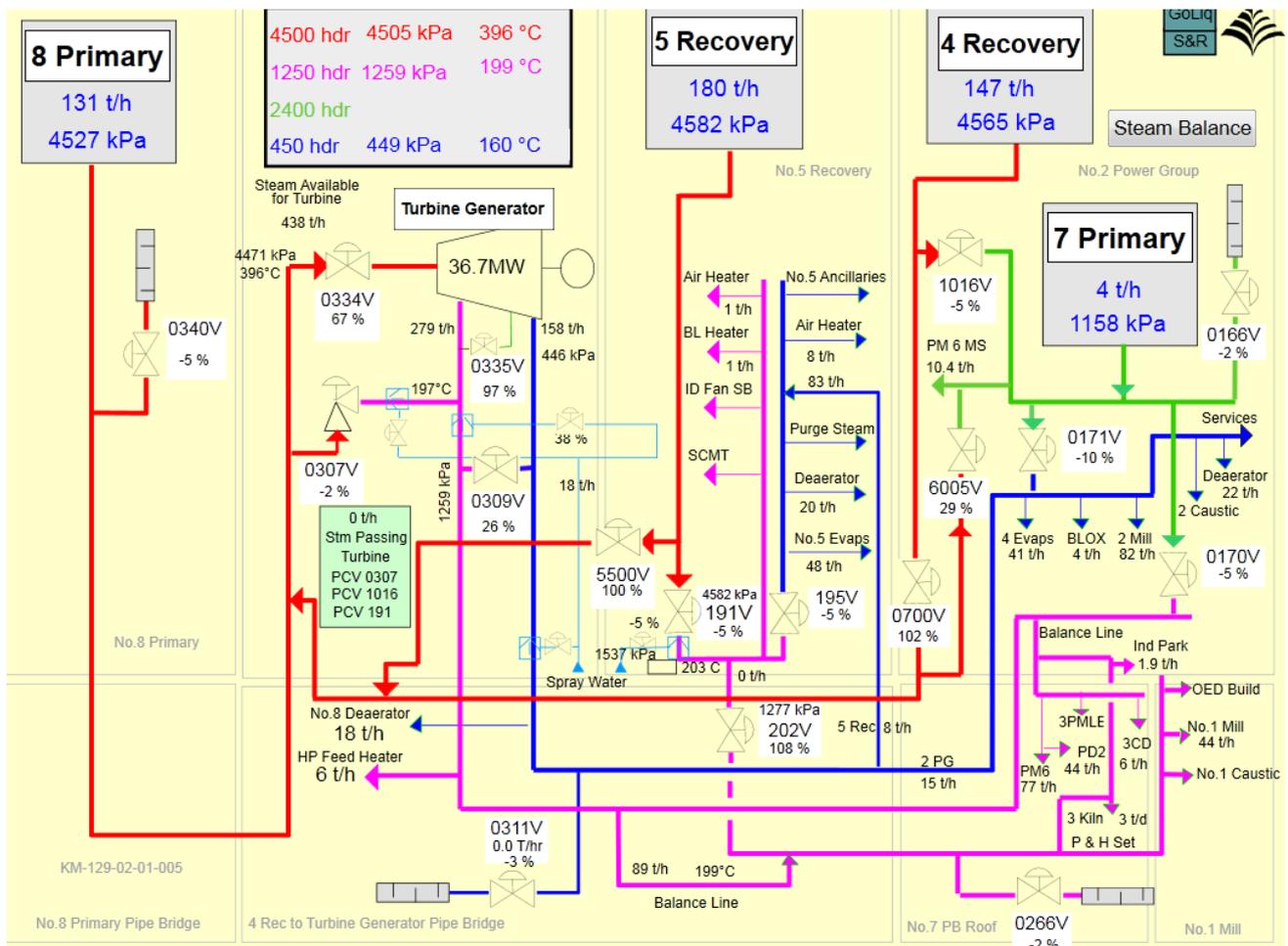


Figure 1. Steam system overview; snapshot of mill during normal operation.

(b) it provides some or all of any by-product of generating **electricity** to that co-located **industrial process**;

The Kinleith site is a net importer of electricity; the electricity generated as a by-product is exported (Generation minus PM6 use) through GXP KIN0112. Most of the site's electricity is imported through GXP's KIN0111 and KIN0113. Note that if the co-located plant is shut or running at a reduced rate, the steam production is reduced, consequently diminishing generated power. Kinleith is not expected to become a net exporter in any expected situation. Below Figure 2 below shows the relationship of the GXP's to the generator.

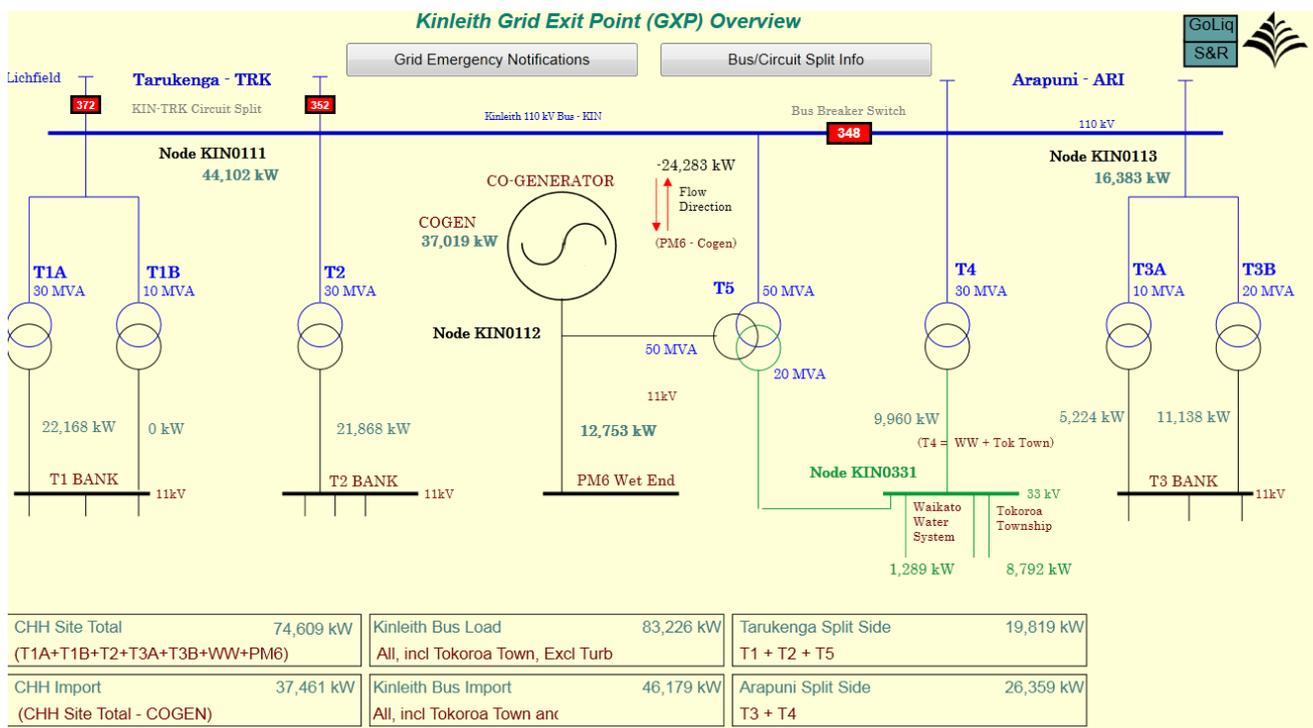


Figure 2. Above. Relationship between GXP's KIN0111, KIN0113 and KIN0112 and the Kinleith site.

Steam for process use is the primary use of the thermal energy from the boilers. Some power is consumed by PM6 Wet End prior to export (to the 110 kV bus) from GXP KIN112. On a net basis (the Kinleith 110 kV bus) the exported power (typically 18~25 MW) is logically immediately consumed by load on GXP KIN0111 and KIN0113.

(c) Generation is tightly coupled to an **industrial process**;

The non-condensing turbine is an integral part of the pressure reduction system to provide steam at the correct pressure and temperature for process uses. When steam generation rate changes due to changes in steam demand from users then the available steam to the turbine varies and hence the generation. Also see attached excel file (*Kinleith Cogen Data Sets*) for a number of examples.

Figure 3 Below shows a typical case from 15th – 22nd March 2015 showing the impact of a number of plant interruptions over a week. Additionally is shows the total Kinleith site steam production and its relationship with generation output.

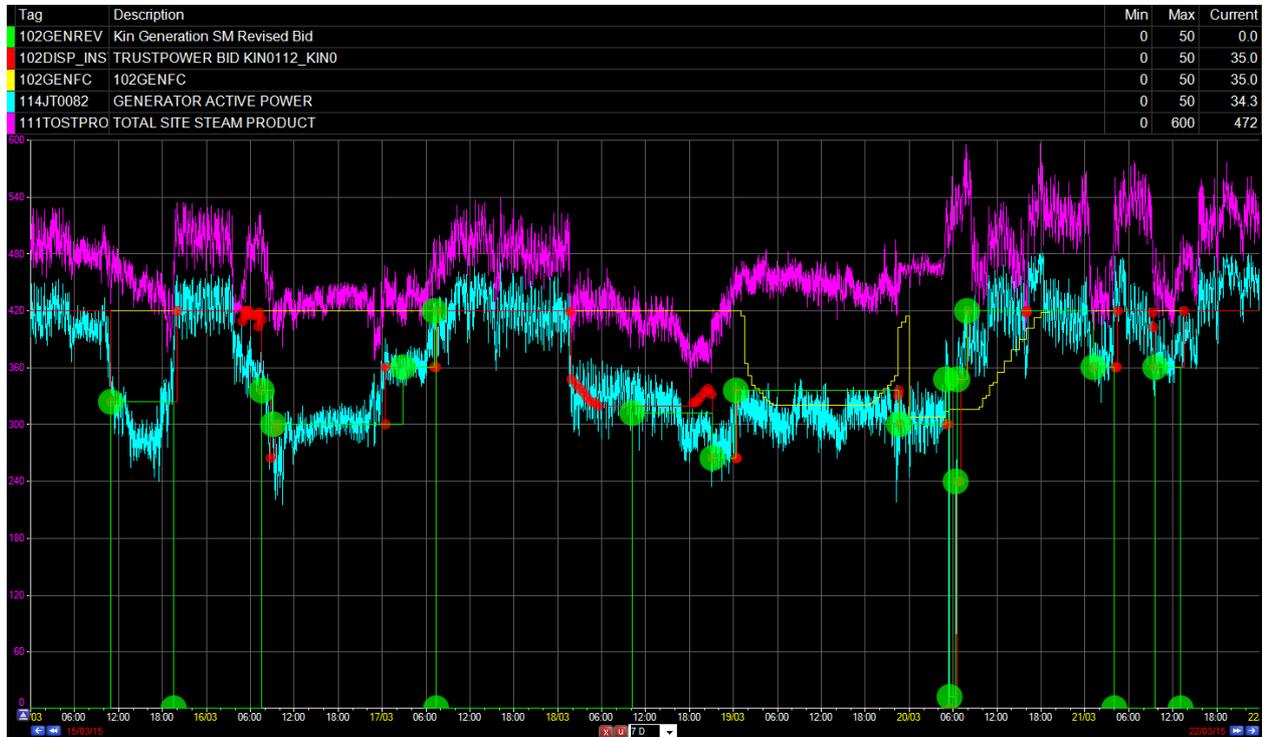


Figure 3. 15th – 22nd March 2015 generator output.

The Kinleith Pulp and Paper mill is an industrial process with the primary purpose of converting Wood into Bleached and Unbleached Market Pulp; various grades of Linerboard mainly Kraft Liner Board; Kraft Top Liner Board; White Top Liner Board and Semi Chemical Fluting. Market Pulp is an additive to many paper grades and Liner Board is a key component in packaging.

Steam is generated primarily from Black Liquor which is the residue of the pulping process; it is a mixture of dissolved organic material, mainly lignin and hemi-cellulose and spent pulping chemicals and water. It is concentrated via evaporation to a point at which it can be burned in the Recovery Boiler's; this is to both recover the inorganic chemicals for reuse in pulping and the energy from the combustion of the organic component of the liquor. Additional steam is generated from Wood Waste residues and Natural Gas to provide the remaining process heat the Kinleith Mill requires.

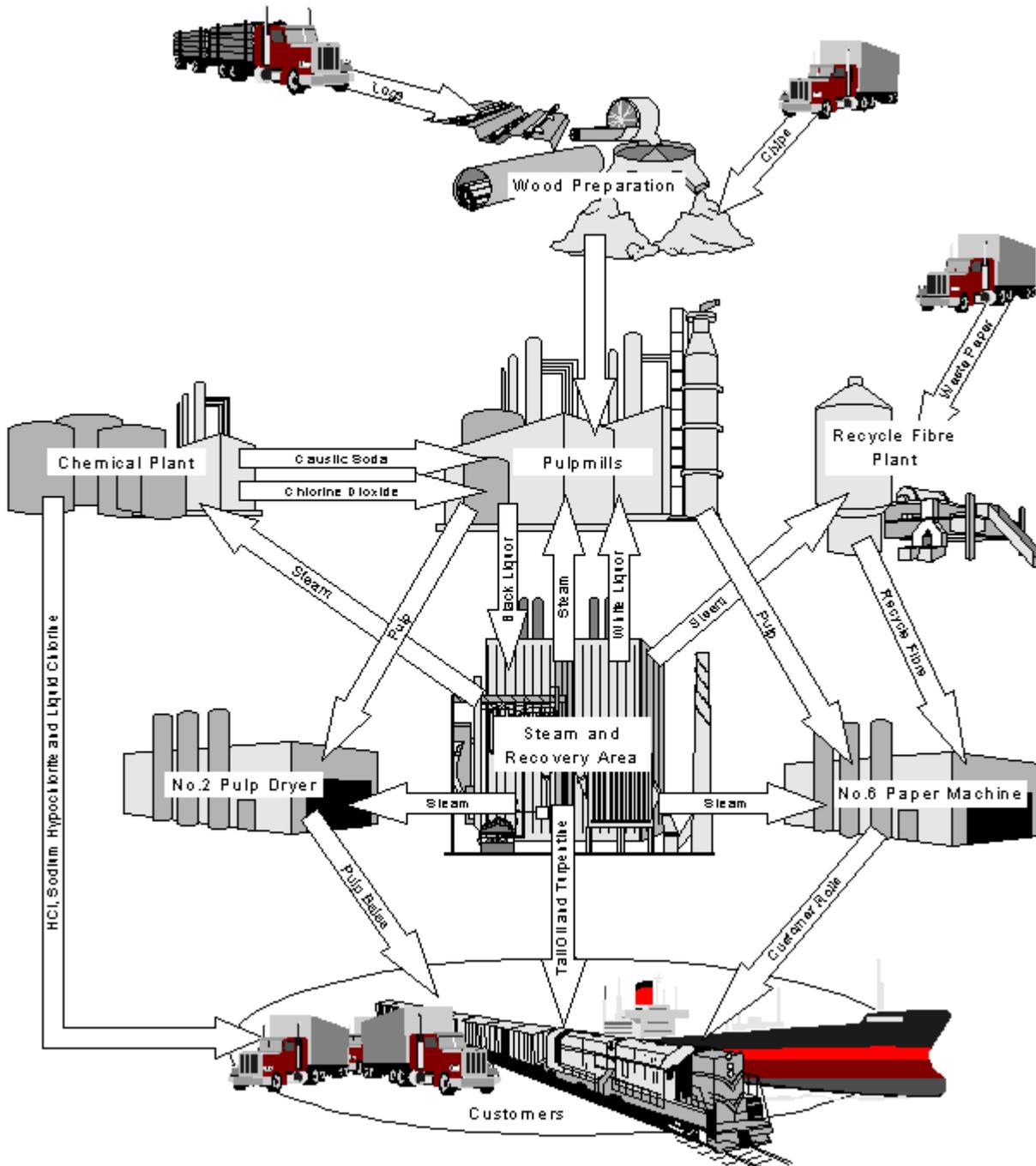


Figure 4. Diagram of relationships between major plants at the Kinleith Pulp & Paper mill

With the turbine being a non-condensing type whose primary purpose is to reduce the high pressure steam generated to a temperature and pressure that is suitable for heating and drying. The steam requirement of the mill is variable due to the complex interrelationship between multiple large steam users; the 6 largest listed below.

Linerboard Paper Machine (PM6) = 70 – 115 T/hr.



Pulp Dryer (PD2) = 40-55 T/hr.

Large Continuous Digester (2CD) = 70-85 T/hr.

Batch Pulpmill (No.1 Mill) = 30-90 T/hr.

2 x Evaporator sets (No.4 and 5 Evaps) = 2 x 45 T/hr.

In addition there are a number of smaller users and a significant amount of auxiliary steam use to support these operations, such as deaerator steam and hot water heating. Plant failures or process interruptions are common in such operations and seldom predictable.