Norske Skog Tasman

Security of Supply
Participant Outage Plan

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Purpose

1. An approved Participant Rolling Outage Plan (PROP) is required by The System Operator as part of its obligation to prepare, publish and administer a System Operator Rolling Outage Plan (SOROP) to manage rolling outages.

2. This PROP, which will be published on the MEUG website (www.meug.co.nz), describes how NST will achieve energy savings at its Kawerau site in the event of a supply shortage declaration by the System Operator.

NST's Load and Interruptible Load

13. Originally the Tasman Pulp and Paper Company was an integrated pulp and paper mill, located on the same site at Kawerau in the Bay of Plenty. However in 2000 Norske Skog Industrier purchased the mill from Fletcher Challenge and the following year sold the kraft pulp mill to Carter Holt Harvey. Tasman (NST) and Carter Holt Harvey Tasman (CHHT) operate as separate businesses on the Kawerau site. To avoid redundancy and/or duplication of expensive assets NST and CHHT have a number of shared services, such as water, effluent treatment, instrument air and electricity. NST has a connections contract with Transpower and will take responsibility for the PROP on behalf of the combined site.

14. NST converts wood chips into mechanical pulp then converts the mechanical pulp into newsprint for NZ and export markets.

15. There is one mechanical pulp mill –thermo-mechanical pulp (TMP) which is divided into two lines. Two rejects refining (RR) lines process rejects from the TMP mill.

16. One newsprint machines (PM3) converts the mechanical pulp into newsprint.

17. Most of the mechanical pulp mill load and about half of the paper machine load is offered to the interruptible load market.

18. NST also operates a geothermal steam turbine (TA3) and has two geothermal power stations embedded in the NST distribution system, TOPP1 (20 MW) and KA24 (7 MW).

19. The MW loads for NST are summarised in the Table 2 below.

Table 2 - NST MW Load Summary

Plant	Approximate MW Load			
	Lines x MW	Peak	Average	Average Interruptible Load
TMP	2 x 26	56	52	52
Rejects Refiners	2 X 12	24	24	24
PM3	13	13	13	7
Other	3	3	3	
TOTAL		**96**	**92**	**83**

Less TA3		8	8	
Less KA24		8	8	
Less TOPP1		20	20	
Net NST Demand		**60**	**56**	

20. NST has been granted an exemption from AUFLS until 2015.

21. CHHT processes some pulp logs into wood chips, and uses the kraft chemical process to convert wood chips into kraft pulp, which is dried for domestic and export use in packaging, paper and building products. CHHT also manufactures bleaching chemicals for bleaching some of the pulp and for selling in the domestic market.

22. Much of the energy required for the pulping and drying processes is recovered from the wood chips, and a co-generation steam turbine (TA2) keeps the net electricity demand relatively low.

23. There are two kraft pulp lines which share a chemical recovery boiler. There is limited storage between processing stages and the output from generator TA2 is dependant on continuous running of the kraft cooking, bleaching, drying and chemical recovery circuit.

24. The MW loads for CHHT are summarised in Table 3 below

TABLE 3 - CHHT MW Load Summary			
Plant	**Approximate MW Load**		
	Lines x MW	**Peak**	**Average**
Kraft Pulp lines	2 x 3.5	6.5	6
Bleach Plant	3	3	2
Pulp Dryers	2 x 2.5	5	4.5
Chemical Recovery circuit	7	7	6.5
Chlor-Alkali Plant	5	5	4.5
Wood Chipper	4	2	1
Other	1-0.5	0.5	0.5
TOTAL		**29**	**25**
Less TA2		15	12
Net CHHT Demand		**14**	**13**

25. Table 4 below summarises the total average MW load on the NST distribution system.

Table 4 - Total MW Load Summary				
Contributor	**Approximate Average MW**			
	Demand	**Generation**	**Net Demand**	**Interruptible Load**
NST	92	36	56	83
CHH	25	12	13	
TOTAL	**117**	**48**	**69**	**83**

CHHT has a connection to the 110 kV bus at Kawerau and as such draws power from the KAW0112 GXP. NST also has a connection to KAW0112 for its generation and paper machine and main mill load. The TMP mill at NST is connected to the 220 kV bus at Kawerau and as such draws power from the KAW0113 GXP.

26. In addition to the above load, the site purchases up to 300 MWh per week (1.7MW typical load) for effluent treatment aeration ponds via the local Horizon Energy distribution system, via GXP KAW0111.

27. Both NST and CHHT operations run 24/7 through the year apart from scheduled maintenance shuts and breakdowns. There are no significant seasonal variations, and so it would be inappropriate to try to measure energy savings compared to "usage during the equivalent period last year" as will be done for distributors[1]. Energy savings will therefore be referenced to the average net demands as shown in table 4. If there is a need for capacity savings, then they should be referenced to the peak MW shown in tables 1 and 2.

28. The mill configurations may change in the future and may alter the load and generation data provided in this PROP, with subsequent impacts on potential energy savings.

[1] This could be erroneous if, at the same time the previous year, a maintenance shut was held.

Potential Energy Savings

31. The NST operation is very electricity intensive, and electricity use is almost directly proportional to production volume. Different grades of newsprint required by the market do have slightly different energy inputs, but the differences are minor, and in any event the grade mix is driven by market demands. The result is that there is very little scope for electricity savings without reducing newsprint production volumes. So any rolling outages for NST will require reduced production volumes.

32. The CHHT operation is much less electricity intensive, but relies on a secure supply to keep the processes running continuously and to maintain generation on TA2. However, there is some potential for CHHT to maintain production levels and save (grid) electricity by:
    - increasing co-generation by non-optimal operation of the steam system.
    - stopping chipping of logs
    - reducing production of bleaching chemicals

Measures that can be implemented

33. Newsprint production may be reduced by shutting the paper machine for a period of time. This option may be used if there is a very large reduction required or if there is a requirement to carry out maintenance work.

34. The preferred means of reducing newsprint production is to slow the machine, as this avoids the costs and quality challenges that arise whenever the machines are stopped and re-started. The TMP refiners would be shut down at various times and this will provide up to 25% reduction in electricity consumption.

35. CHHT is able to save up to 25% of electricity consumption by a combination of increasing co-generation through its steam turbine, stopping wood chipping and reducing production through its chlor-alkali plant. The actual actions taken would depend to a great degree on whether the event was an immediate or developing event.

36. An immediate event would normally be able to be responded to via increasing co-generation and stopping chipping. A developing event could be responded to via increasing co-generation and a combination of reduction in chipping and reduction in chlor-alkali plant production. Any decision on this combination would have to be taken at the time depending on wood chip inventories and availability of purchased additional chemicals (caustic soda) to maintain pulp production.

37. Given that the CHHT net load is only about 10% of the total site load, NST will be responsible for determining how any allocated savings targets for the total site will be met. Savings targets will be met primarily by reducing newsprint production, probably supplemented by smaller savings by CHHT, depending on production and inventory conditions at the time.

38. The costs for actions taken by CHHT are:

- For Immediate and short duration events increased costs due to inefficient co-generation would depend on mill operations at the time, but could be in the order of $550/MWh. The cost of reduction in chipping would be essentially zero as long as wood chip inventory allowed ongoing pulp production.

- For developing and long term events, it is difficult to estimate costs now as they would depend on the situation at the time.

39. The electricity intensity of NST's newsprint production means that high spot prices would normally make it uneconomic to maintain full production, long before a developing event lead to rolling outages. Given sufficient lead time, alternative (lower cost) means of supplying NST's customers would already have been arranged, and production curtailed.

40. Meeting savings targets of up to 25% by NST would normally affect only export volumes. The cost to the NZ economy from the loss of export newsprint volumes would be of the order of $75 to $150 per MWh. Note that the cost is influenced by a number of exogenous factors including sales prices and currency exchange rates.

41. In the case of an immediate event, it is conceivable that significant additional costs could be incurred by NST in order to honour an important newsprint market commitment via alternative means. Although this scenario is unlikely, the costs of electricity savings could initially be as high as $500 per MWh until lower cost supply arrangements could be implemented.

42. In the case of a developing event, NST will review the costs of savings (which are dependent on market conditions and other factors) and may submit a revised PROP for the System Operator to consider. This could include revisions for the CHHT load.

43. For the purpose of making a decision about the most appropriate savings targets, the System Operator should make the following assumptions for all electricity savings up to 25% for the total site:

- For immediate and short duration events, a cost of $75-$175 per MWh;

- For developing and long term events, a cost of $75-$550 per MWh.

44. For avoidance of doubt, it must be noted that the above costs of savings account only for lost production from planned and managed reductions of up to 25%. A total loss of electricity supply or any unplanned plant shutdown inevitably incurs very high costs to re-start the complex production processes, in addition to the costs of lost production.

System Operator and Communications

45. The Energy Manager is the key person for interfacing with the Electricity System Operator and/or the System Operator, and has System Operator to implement the plan.

46. Communications on administrative matters between NST and the System Operator will flow according to table 5. The NST positions in the table are

expected to remain fixed, but if the persons in those positions changes then NST will advise the System Operator of any new contact details.

Table 5. Communications between NST and the System Operator on Administrative Matters	
From System Operator: Declaration of supply shortage Revocation of supply shortage Advance notice of declaration or revocation Notice to approve or decline PROP	**To NST:** **Key Position:** Energy Manager Graeme Everett Phone 07 323 3708 Email: graeme.everett@norskeskog.com **Alternative NST Position:** Finance and Commercial Manager Susan Flay Phone 07 323 3829 Email: susan.flay@norskeskog.com
From NST: Provide PROP to System Operator Update PROP information to System Operator Energy Manager Graeme Everett Phone 07 323 3708 Email: graeme.everett@norskeskog.com	**To System Operator:** Senior Security of Supply Analyst System Operator, Transpower House, 96 The Terrace, PO Box 1021, Wellington.

47. Communications on operational matters will be between the System Operator and the Norkse Skog Tasman Electrical Control Room Operator.

48. During a supply shortage situation, the SO will communicate directions to NST. NST will keep the SO aware of its specific plans for meeting the target level of savings and will closely co-ordinate removal and addition of load.

Monitoring and Compliance during a Supply Shortage Situation

49. During the period in which the System Operator has directed rolling outages, the Energy Manager will monitor and review actual savings compared to targets, usually on a daily basis, but at least weekly. The Energy Manager will decide, if necessary, what further adaptation of the plan NST will undertake to meet the required savings target.

50. NST will provide, at least weekly or more frequently if required by the system operator, information on:
- the level of consumption relative to target levels
- the nature and extent of outages at the site

Coordination with grid emergencies

51. Arrangements to manage grid emergencies (as defined in Part 1 of the Code) will take immediate priority over the implementation of rolling outages. NST and CHHT will comply with whatever instructions are provided during the Grid Emergency.

Once the Grid Emergency is over, NST and CHH will revert to the PROP if rolling outages are still required.