

Memo

To
Calton Frame

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This memo serves to provide an update on detailed design alterations to mill specifications based on the selection of equipment suppliers (Parts 1-6), and to clarify matters raised in our meeting of 9th May 2007 (Parts 7-11).

1 EVAPORATION CAPACITY

The evaporation capacity specified in the IIS was 1200 tH₂O/h.

The anticipated excess margin in the evaporation plant capacity is addressed in the witness statement of Esa Vakkilainen as follows indicating that an extensive reserve for spills was included in that figure.

Extra Evaporation Capacity		Eucalyptus	Pine
Annual production	ADt/a	1,100,000	
Daily average	ADt/a	3,143	2,043
Evaporation - Department Design Capacity ²	t H ₂ O/h	1,200	1,200
Balance value (with reserve, spills and water ingress)	t H ₂ O/h	1,155	988
-spills	t H ₂ O/h	67	43
-reserve 10%	t H ₂ O/h	120	120
-total	t H ₂ O/h	187	163
Evaporation (without reserve and spills)	t H ₂ O/h	968	825
Extra capacity for handling spills	%	19%	31%

The purchased evaporation capacity from Andritz is 1100 t H₂O/h. Although this is less than the IIS value (1200 t H₂O/h) there will still be a very large extra capacity to cover spills similar to the extra capacity indicated above. This is due to the following factors:

- The purchased concept has been based on a guaranteed lower cooking alkali charge than the value used for the IIS calculations (48 t less water to be evaporated).
- The value that the vendor uses for washing allowance is not included in the 1100 t H₂O/h
- The capacity of the plant can be increased by increasing the pressure of the low pressure steam to the evaporation plant

The evaporation plant has more than adequate excess capacity to cope with the spills.

2 D1 WASHER

In the IIS the bleach sequence is Do – EOP – D1 – D2 with the first D stage (Do) being able to operate as a hot acid stage (A/Do) and the final D2 stage being able to operate with peroxide.

The purchased bleach sequence concept is A/Do – EOP – D1 – D2 with no washer between the D1 and D2 stages but with the space to add it at a later date.

The design of the system and the material selection at the moment is optimized for operating the last stage as a D stage, but the stage can be operated also with peroxide.

3 DREGS REMOVAL

In the IIS the dregs removal from the causticising plant has been based on a conventional dregs filter concept. The IIS states that dregs centrifuge is an alternative system for removing dregs (Vol. 6, section 3.8.6, page 78). The centrifuge was the purchased concept chosen.

4 TURBOGENERATOR

In the IIS the rated capacity for the turbogenerator was 190 MW. The purchased concept resulted in lower extraction steam requirements for the process which meant that a higher amount of steam available for condensing and hence higher power generation than stated in the IIS. The rating of the purchased turbogenerator is 215 MW.

5 STORAGE TANKS

Storage tanks have been optimized to suit the process. In general the tank capacities are slightly less volume than indicated in the IIS.

6 DNCG COMBUSTION IN THE LIME KILN

The witness statement by Esa Vakkilainen mentioned an option for burning the DNCGs in the lime kiln. Due to the already extensive NCG collection and burning system with multiple back-up systems, this option has not been exercised.

7 USE OF BRINE FROM THE CL/K REMOVAL SYSTEM AS RAW MATERIAL FOR THE CHEMICAL PLANT

Brine from the Cl/K removal system can not be used as make up brine for chemical production due to the impurities, mainly sulphate contained in it.

8 LAY-OUT

The current development of the lay-out has been outlined in a separate memo already issued by Gunns.

9 CHEMICAL PLANT EMISSION

A separate memo will be prepared by Gunns on the emissions from the proposed chemical plant systems.

10 REDUCTION OF VISIBLE PLUMES

The design of the mill is based on concentrating the emission points and reducing the number of plumes including the following main aspects:

- All NCGs and tank vents also collected also from recausticizing. This reduces plumes as water content in them is high.
- Burning dissolving tank vent gases in recovery boiler. Dissolving tank vent gas plume is the most visible plume
- The mill will be having a common, high stack, which ensures that the flue gases are spread efficiently and that the plume is smaller.
- Using high dry solids black liquor and high lime mud solids. The portion of water vapour in flue gases is reduced.
- Centralised cooling tower to cover most of the cooling purposes.
- Cooling the effluent going to the effluent treatment. Lower temperature decreases water vapour emission from effluent ponds.
- High dryness content of the pulp entering the pulp dryer and efficient heat recovery from drying machine.

11 TABLE 3-18

The purpose of the indicative figures in brackets is to demonstrate the potential use of bleaching chemicals under different chemical plant design concepts (whether it is integrated or non-integrated plant), and are meant to represent a range. We understand that this consumption table can cause confusion when read as representing two alternative cases. To avoid confusion it is suggested that only figures referring to the base case are used in this table.

Bleaching		Plantation Euca	Pinus Radiata
Target brightness	% ISO	90 +	90
Sequence		D-EOP-D1-D2	D-EOP-D1-D2
Chemical charges: (tentative)			
- ClO ₂ (as ClO ₂)	kg/ADt	12.2	17.9
- HCl	kg/ADt	5	1
- NaOH	kg/ADt	15	25
- O ₂	kg/ADt	2	5
- H ₂ O ₂	kg/ADt	2	2
- NaHSO ₃	kg/ADt	3	3