BSW Measurement In-line Analysis and Optimization

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• BSW optimization study was done in 2009/2010 in a Finnish pulp mill
• 12 refractometers were installed to BSW line to measure total dissolved solids
• Sophisticated software tools were used to analyze the washing results
RESULT – DIGESTER WASHING
RESULT – PRESSURE DIFFUSER
RESULT – PRESSURE DIFFUSER

![Graph 1: Downward velocity of the screen vs. $E_{G0}$](image1)

![Graph 2: Downward velocity of the screen vs. Washing loss](image2)
RESULT – OXYGEN DELIGNIFICATION
RESULT – OXYGEN DELIGNIFICATION
INSTALLATION SITES TO OPTIMIZE BSW WASHING EFFICIENCY

INSTALLATION SITES:
• Black liquor to Evaporation plant
• Digester’s blow line
• Pulp to Oxygen delignification
• Pulp to Bleaching plant

GOOD INSTALLATION SPOTS:
• After a pump
• After dilution
• Wash filtrate – Before filtrate tank
INSTALLATION SITES TO OPTIMIZE DIFFERENT WASHERS

- Pulp outlet
- Wash liquor to washers
- Wash filtrate from washers
Production Rate: 660 ADt/d
Wood Species: Mixed western US softwood (mixed pine, douglas fir, white fir)

**Installation Sites:**
- Pulp outlet from drum washer to pulp tower
- Pulp outlet from decker to pulp tower
- Wash filtrate from decker to drum washer
- Pulp outlet from digester (will be installed during the next outage, May 2011)
2B WASHER
Concentration: 0.6 TDS%
Consistency: 8-11 %
50 kg/BDt

DECKER
Concentration: 0.2 TDS%
Consistency: 8-11 %
20 kg/BDt
INSTALLATION EXAMPLES

PULP OUTLET FROM PD

WASH FILTRATE TO DIGESTER
BENEFITS OF IN-LINE REFRACTOMETER MEASUREMENT

- Reveals concentration and process variations
- Continuous, accurate and fast response time
- Total dissolved solids are measured
- Can be used for controlling
- Can also be used to measure liquor in pulp
- Provides new possibilities for implementing higher level process optimization for BSW
- Tool to improve washing efficiency and to reduce production costs