

SCALEWATCHER® CLEANS UP IN THE PAPER INDUSTRY

ARJO WIGGINS, United Kingdom

Buckland Paper Mill, situated on Dover's River Dour in Kent, originated in 1770. It is now one of a number of mills owned by Arjo Wiggins Fine Papers Ltd., part of the Arjo Wiggins Appleton conglomerate. Buckland Mill produces 25,000 tons of fine quality paper from two paper machines, principally for its prestigious Conqueror brand of business stationery.



In 1994, Arjo Wiggins and Scottish HydroElectric together designed and constructed a gas turbine powered Combined Heat & Power Plant. The Plant is used to generate electricity and steam for the papermaking process. Surplus power is exported to the National Grid.

The CHP Plant uses raw water from on-site wells to cool the boiler blowdown vessel. Within seven months of operation, up to 1½" of scale had accumulated on all surfaces in contact with the cooling water. Initially, the vessel was manually descaled which proved to be laborious and very time-consuming.

A *Scalewatcher* unit was installed onto the 1½" cooling water line to the blowdown vessel.

A small area within the vessel was cleaned and the remainder left scaled-up to demonstrate the unit's ability to reduce existing scale in addition to preventing its formation. Regular inspections were carried out during the trial period and record photographs taken. It was noted that not only had the System halted the scaling process but was also actively descaling the vessel.

Commenting, Alex Fraser said:
"We are extremely pleased with the System, and are delighted to have found an environmentally-friendly means of treating what was an undesirable and labour-intensive problem".

HANOVER PAPER MILL, Germany

The Hanover Paper Mill, Germany produces around 250,000 tons a year of fine-coated paper for the printing industry. Its warehouse requires a standard temperature and humidity, which is provided by an air humidifier. Fresh water is fed to a perforated rotary drum measuring 2.5m³ by the humidifier, is vaporized and then partially carried away by the airflow passing through the drums. Residual water drops down and is then reused.

Every three months severe scale build-up on the jets and filters necessitated their replacement and resulted in increased energy costs.

It was also anticipated that the drum would soon need renewing because of continuing scale build-up.

In order to resolve the problem *Scalewatcher* was installed on the circuit. Within weeks hard scale was replaced by a slimy cover, which is

now easily removed with high pressure cleaning once a month.

The System has drastically reduced maintenance costs on replacement parts, downtime and labour, and provided a payback to the Hanover Paper Company in less than 15 months.

MITSUBISHI PAPER COMPANY, **Japan**

The Mitsubishi Paper Company's Harinone Mill in Aomori prefecture, Northern Japan, has installed a *Scalewatcher* System on to a 2" pipe within its flat paper process line.



Paper liquids with a CaCO_3 concentrate of between 10-15% are pumped out from a header tank through a 3-inch pipe. The liquid is then diverted into 4 separate lines with a vibrating feeder attached to the end of each line.

Scalewatcher was installed on to one of the lines in December 1994. In February, after approximately 2 months operation (including a suspension of 10 days due to an earthquake), it was reported by the customer that **“the line being treated by *Scalewatcher* now required cleaning just once a day whilst the other three lines still required their usual twice daily clean.”**

KNP PAPER MILL, Netherlands

Situated in Nijmegen, in the East of Holland, the KNP Paper Company produces 200,000 tons a year of wood-free, white, coated paper which is exported throughout the world. The factory uses approximately 500 m³ of bore hole water each hour which is first deionised in a water treatment plant before being treated by the *Scalewatcher* System.

Prior to *Scalewatcher* being installed, the plant used continuous acid dosing to prevent the build-up of scale in pipelines and related equipment including nozzles. However, this caused corrosion and was not totally effective. *Scalewatcher* was fitted to the main water pipe feeding the factory. For the first ten months KNP continued to use acid dosing alongside the water treatment.

Four month's later the plant management decided that intensive acid dosing was unnecessary and it was discontinued.

PARENCO, The Netherlands

Parenco produces around 400,000 tons of newsprint a year. The process involves recycling waste paper in the company's deinking plants by removing the ink and contaminants in a very closed loop system that continually uses the same water. The water contains large amounts of salts (carbonates, oxalates and silicates of calcium/magnesium/aluminium) and other soluble materials and chemicals. These salts cause scaling within the pipes, filters, and pressure screens.

The pipes and filter bags needed acid descaling and high pressure cleaning during plant shutdown every six

months. In addition, the cleaners and screen baskets required descaling every three months. Blockages occurred in screen baskets, showers and pipes causing a substantial loss of production.

An initial test was carried out on one process line using *Scalewatcher* and within a matter of months it was noted that the scale was softening and was easy to remove. Following this success, *Scalewatcher* was extended to cover the other 3 process lines, and has now considerably reduced the scale build-up.

Since then, there has been less production loss due to blockages and there has been no necessity for plant shutdown in order to acid descale. Parenco anticipate that cleaning time will be decreased by around 66%.

REPAP, Canada

A subsidiary of REPAP Enterprises Inc., REPAP in New Brunswick, Canada, has two sites producing daily, 250 metric tons of bleached and unbleached softwood pulp, 1300 tons of lightweight coated printing papers and 350 tonnes of bleached and unbleached ground wood pulp. The two sites use approximately 21.5 million gallons of water per day.

REPAP had experienced severe scaling problems inside the smelt tank and also on the recirculating line and mixing blades. The scale had been treated by using hydro blasting during the plants shutdown periods. However, despite this, the scale would coat the inside of the smelt tanks and there would be approximately 4 feet of sludge on the floor of the tank. In addition the recirculation and extraction lines

would block with scale, and build-up on the mixing blades caused premature wearing of the bearings which resulted in the burning out of the motors.

Scalewatcher was installed onto the 8" recirculation lines approximately 2 feet from the entry point of the smelt tank and onto the 6" green liquor transfer lines at approximately mid-point of the lines, which also included the weak wash line. The second system was installed to eliminate scale in the green liquor lines and to treat the weak wash before entering the smelt tank.

After three months the smelt tank was opened for inspection. The tank walls contained little or no scale, the floor grates were visible and the mixing blades were scale free.

REPAP then decided to discontinue hydro-blasting and all future inspections. The efficiency of the smelt tank and equipment has now greatly improved.

FAPAJAL, Portugal

Situated in Loures, Fapajal produces around 26,500 tons of paper a year. This includes printing, uncoated and toilet paper as well as soft, woodfree and groundwood free paper.

Steam for heating the paper machine's drying cylinders causes condensate, which is collected in separators. The vacuum pumps draw the incondensable gases from the top of the main separators to prevent air locks. Limescale build-up occurs in the vacuum pumps caused by the high temperature of the condensate.

To remove the scale, the vacuum pumps required regular acid and

manual cleaning resulting in downtime and lost production. The blockage caused a 60% reduction in the internal diameter of the pipe necessitating frequent plant shut down to acid descale.

A site survey was carried out by Flocare Engineers and water samples taken. An analysis found that the water contained total dissolved solids of 770 mg/l and suspended solids of 12 mg/l. The pH balance was 7.4 and the water had a conductivity of 1350 micros/cm. Chloride was found to be 82.3 mg/l Cl and there was a total alkalinity of 265 mg/l CaCO³ and hardness of 145 mg/l CaCO³.

A *Scalewatcher* System was fitted to a 2" sealed water line feeding three Ervepa vacuum pumps each running at 325 rpm.

Regular inspections were carried out over a two-month period and it was noted that the vacuum pumps were remaining clear of scale.

A final inspection was carried out on the 60th day and an order placed with Flocare for the *Scalewatcher* System. Since then the vacuum pumps have remained scale free, providing Fapajal with cost savings on downtime, lost production, labour, and the early renewal of capital equipment.

STORA FORESTER, Canada

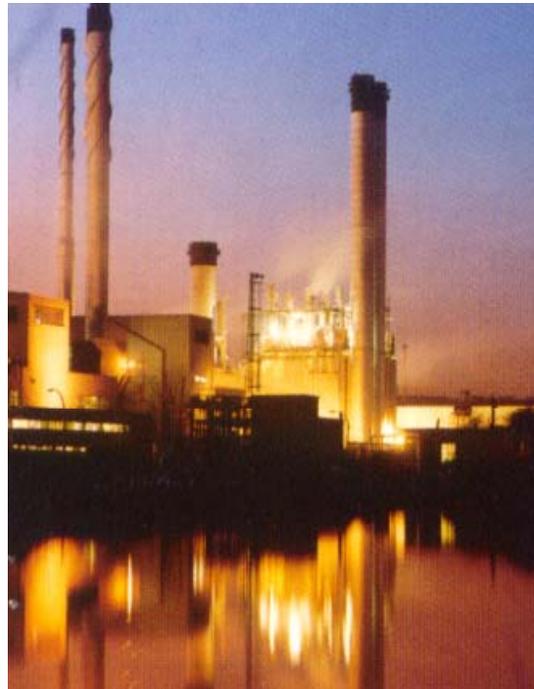
The Stora Forester paper mill in Nova Scotia produces around 170,000 metric tons a year of bleached sulphate pulp and an equal amount of newsprint.

Until *Scalewatcher* was installed, the company attempted to retard the level

of scale build-up in the liquor lines by reversing the directional flow of the green liquor every two days.

Despite this, Stora Forester had to shut down production every six months to hydro-blast the lines.

Although this removed part of the softer limescale it could not shift some of the hard scale build-up.



Scalewatcher was installed on two 4" parallel green liquor lines leading to and from the digester. One month after the units were installed, the company had its usual six-month shutdown for line cleaning.

When the lines and pumps were opened for inspection, it was noted that 70% of the scale had disappeared, including some of the hard scale which the hydro blasting had not been able to remove.

A further inspection took place six months later and it was found that even more scale had been removed by the System.