



Alfa Laval Performance Audit and Cleaning Services deliver efficiency

Mincio Thermoelectric Power Plant, Ponti sul Mincio (Italy)

Case story



Mincio Thermoelectric Power Plant (aerial view)

A thermoelectric power plant works on a continuous cycle. Turbines, alternators and auxiliary components all have to be constantly cooled to avoid a loss of power plant output and possible damage to machinery. The heat exchangers therefore have an important role to play. The 380 megawatt Mincio Thermoelectric Power Plant, which is owned by four northern Italian public limited companies, has two Alfa Laval M30 heat

exchangers. A Cleaning in Place (CIP), part of Alfa Laval Cleaning Services, using the CIP 800 and the Alfa Laval Performance Audit predictive maintenance solution enables the plant to work at maximum efficiency, without unscheduled stoppages and radical maintenance work such as opening up the heat exchanger.

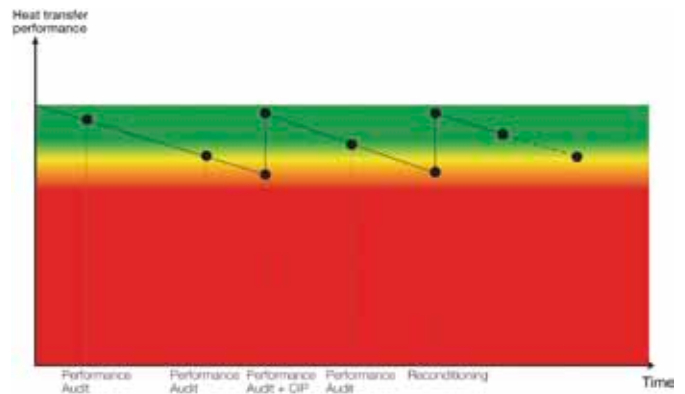


CIP 800 Cleaning in Place

Ponti sul Mincio is in the province of Mantua, just south of Lake Garda. Along the Mincio, one of the loveliest of Italian rivers, the Mincio Thermolectric Power Plant has stood since the end of the sixties within the Parco del Mincio, in an area of high landscape value: this plant is owned by four northern Italian public limited companies, which were formerly municipal undertakings, (A2A, the result of the merger of AEM Milano and ASM Brescia, AGSM Verona, AIM Vicenza and Trentino Servizi). The plant consists of a gas-fired combined cycle turbine (the heat from the gas turbine exhaust gases is recovered by a steam generator which powers a steam turbine). The owner companies sell the electrical energy on the market through the relevant stock exchange or supply private and industrial clients directly.

When it was opened in 1966, the power plant was owned only by the two municipal undertakings ASM Brescia and AGSM Verona. It had one traditional 80 megawatt thermal generating set, which remained in service until 2004. The second generating set, 160 megawatt, came into service in 1983 and was combined with a 250 megawatt gas turbine in 2004. Alfa Laval had already been involved with the original installation, having supplied the cleaning centrifuges for the turbine and alternator lubrication systems. When the second generating set was converted to combined cycle, new Alfa Laval components were added, specifically the two M30 heat exchangers (one in reserve). These heat exchangers use water taken from the Mincio river to cool the water in the closed cycle system that collects the heat generated by the plant.

Cooling is essential in a thermolectric power plant. The river water is rich in organic substances that foul the channels in the heat exchangers, causing them to lose thermal exchange capacity. This can lead to damage to bearings and other mov-



Performance Audit - Predictive maintenance solution (graph)

ing parts in machinery - particularly in the gas turbine generating sets, steam turbine and associated alternators - due to high operating temperatures resulting from inadequate cooling. A predictive system used to monitor the efficiency of the exchangers and the variation in efficiency over a period of time can help to avoid this critical situation, so that maintenance cleaning operations can be arranged when needed.

The first few years of operation of the combined cycle gas turbine generating set highlighted the need to arrange for regular cleaning of the exchangers. Very briefly, the exclusive Performance Audit system assesses the degree of fouling of the exchangers without the need to open them up. The Alfa Laval Service team was a known partner, working with the Power Plant on maintenance for the oil cleaning centrifuges. "In 2007", relates Luca Di Martino, Sales Engineer for Service-Process Technology, "we suggested that the Mincio Thermolectric Power Plant should use our predictive maintenance solutions and the partnership took off. We suggested



M30 heat exchanger installed at customer's plant

leasing our cleaning unit and a performance agreement was sealed on a two-yearly basis based on the Performance Audit system." By collecting data on the operation of the exchangers and processing the data, Alfa Laval predicts when the critical point is approaching and identifies when cleaning will be needed. "Since the plant works continuously," continues Di Martino, "we suggested a fixed maintenance timetable at a pre-determined price. In other cases we use Performance Audit without scheduling maintenance operations in advance but carrying out work when the data shows it is needed."

The system has been running since 2007, with complete customer satisfaction. "In order to keep the plant running efficiently," explains Luciano Aletto, Plant Manager since 1993, "we decided to rely exclusively on Alfa Laval. We have great confidence in their competence as a manufacturer of exchangers and our trust has been rewarded: the mechanical cleaning systems for the plates combined with the use of chemical detergents suggested by Alfa Laval are very efficient." But the agreement did not solve this problem alone: Aletto continues, "We also had some minor leakage problems which Alfa Laval quickly solved by suggesting the right spare parts. So this is another reason we are pleased we have linked up with a manufacturer of major components of our plant. Alfa Laval guarantees the constant, perfect efficiency of our plant, in short, non-stop performance."



Heat recovery steam generator and chimney

Cleaning in Place delivers long life to heat exchangers

The CIP modules improve exchanger performance, prolong their service life and extend maintenance intervals. The modules are made of stainless steel and a huge product range is available. The CIP 800 has an 800 litre (211 gallon) tank and its centrifugal pump gives a capacity of 40 m³/hour (178 GPM); the delivery hose is 4 m long (13.1 ft). The electrical heating system has an output of 12 kW which guarantees a maximum temperature of 70°C (158°F) for the washing liquid. The CIP 800 measures 1735 x 2160 x 1260 mm (68.3 x 85 x 50 inches) and weighs 500 kg (1102 lb).

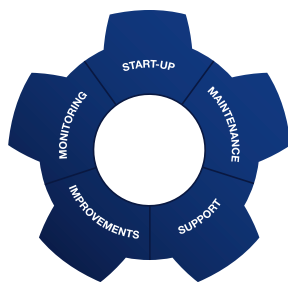
Alfa Laval offers two predictive maintenance packages, based on Performance Audit software:

- The internal information package consists of a number of Performance Audit measurements, not linked to maintenance operations. In this case the customer chooses whether or not to carry out maintenance: Alfa Laval offers appropriate, attractive cleaning solutions and exchanger reconditioning packages.
- With the internal protection package the contract also provides for some form of assistance, which is defined when the contract is drawn up. For example, it is possible to lease the CIP and purchase the detergents when needed, or to have the work carried out by Alfa Laval personnel with high pressure water lances.



Cleaning in Place CIP 800

360° Service Portfolio



360° Service Portfolio

The Alfa Laval 360° Service Portfolio covers the entire lifecycle of your equipment, and brings you maximum uptime, high performance, low maintenance and operating costs.

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How to contact Alfa Laval

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