Italian Power Plant Uses GE Mobile System to Remain Within Condensate Discharge Limits

Challenge

When returning from an outage, the owners of a power station in southern Italy using an Air Cooled Condenser (ACC) system wanted to avoid discharge of dirty condensate, to remain within the plants discharge limits. Additionally, the power station owners wanted to utilize any gain from the residual heat in the reclaimed condensate.

The ACC system employed allows for the recycling of the condensate, but this can only be done once major contaminations are removed. The contamination in this project derived mainly from iron and oxides.

Solution

GE Water & Process Technologies provided a solution with a 'special applications' condensate polishing mobile trailer to reclaim and treat the hot condensate.

The three-cation and three mixed-bed ion exchange vessels trailer treated the condensate to remove impurities present in the water. This meant an immediate decreased reliance on fresh water for make-up water, for steam generation, coupled by a reduction of wastewater discharge at site.

When the dirty condensate was received it was passed through a 100-micron basket filter to capture any loose material, which may have fallen into the water loop. Following this, mixing the condensate with cold demineralized water in a 92,500 g (350 m^3) basin lowered the temperature. This was done prior to being sent to the GE mobile water trailer in order to protect the ion exchange resin, which has a maximum working temperature of around 120°F (49°C).

Flow Rate	24,000 gpm (90 m^3/h)
Outlet Conductivity	<0.2 µS/cm
Outlet SiO_2	<20 ppb
Outlet Iron	<20 ppb Fe

As a 'special application' a few additional considerations were needed, which are not applied when operating a standard MobileFlow* trailer.

The first is the feed water flow of 8,700 to 12,000 gpm (33 to 45 m^3/hr) being required to rinse the trailer into specification before feeding the customer. This is done due to the flow path setup to ensure the correct output quality. The second issue relates to the variability of the feed condensate quality. Particularly, in this project where variations in suspended solids and iron concentration could lead to high-pressure drops causing reduced product flows and premature exhaustion of the ion exchange resin polishing the hot condensate.

Additionally, often, a build-up of particles on the cation beds leads to difficulty when regenerating the ion exchange resin, therefore, measures are employed to protect the cation beds and ensure a more effective process.

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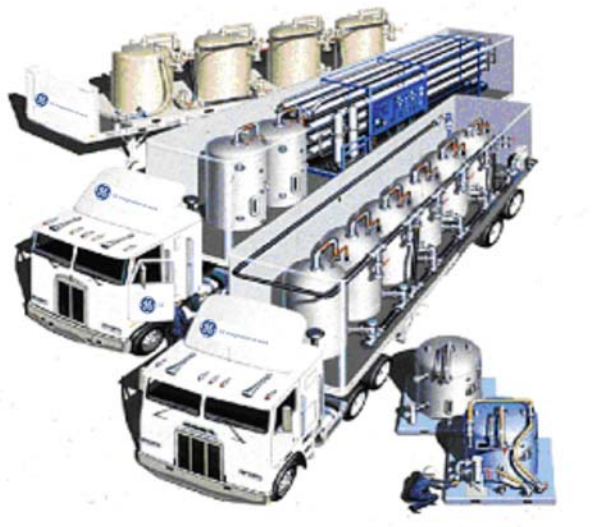
This protects the mobile equipment but ensures the forecasted operating-length of the condensate polishing ion exchange resin is more accurately calculated. This then gives greater confidence in the project continuing as forecasted.



Results

The design and use of the condensate polishing system helped protect the power plant when returning from the outage. Generally the use of such a process increases plant operational life and helps prevent build up of any potential contaminants within the water loop.

The condensate polishing process benefits the local environment as it reduces fresh water extraction and means lower discharge of dirty condensate. There is also a benefit through recovery of waste heat in the condensate which means less energy is needed to reheat the condensate, as once treated it is resent to the power plant water loop at around 113°F (45°C).

The customer was satisfied with the service and the solution provided by GE to meet the project needs. The original contract was extended to cover an additional few months. Due to the flexibility of the contract and equipment the project was able to continue without any hindrance.

Mobile Water Treatment Process Flow