

Sellafield Limited (formerly BNFL) have installed a new self-contained steam plant at their site in Cumbria, England as part of ongoing modernisation and improvement in the way essential services are provided.

The steam supply comes from a Clayton Steam Generator which is mounted in a steel container along with all of the other necessary boiler house equipment.



The Clayton Steam Generator is compact in size and has inherent safety, reliability, and efficiency features. The reason for these advantages comes from the principle of operation which is very different from that of the conventional shell (or firetube) type boiler.

In a firetube boiler, a large mass of water is stored in a cylindrical vessel and heated to form steam. The Clayton Steam Generator, by comparison, uses forced circulation of water through a helical coil which is continuously heated to generate

the steam. This means that only a small amount of water is stored in the steam generator and start-up can be extremely rapid. This method of steam production has a major knock-on safety advantage since it is not possible to have a steam explosion with the Clayton design. Gerry Rooney, Sales Manager of Clayton Thermal Products Limited who supplied the new plant said *“we have been constantly expanding the range of sizes available and it is no longer necessary to choose a shell boiler where up to 10 tonnes per hour of steam is required from a single unit”*.

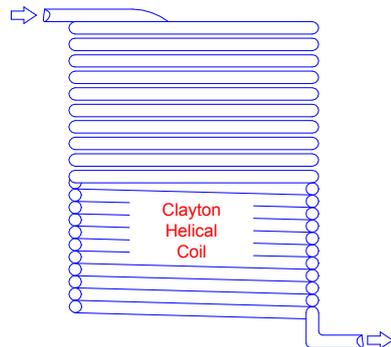
Due to its small size it is possible to easily mount a Clayton Steam Generator in a standard size container along with all of the necessary ancillary equipment. This includes the feedwater tank, water softening plant, chemical treatment, pumps, blowdown tank as well as all of the essential valves and controls.

The container itself is fully weatherproof and is fitted with integral cooling for use when the plant is live - and a frost protection device which comes into action at low temperatures.

An added advantage of the packaged solution was that the complete boiler house system can be proven and tested in the factory before delivery. This was carried out under the scrutiny specialists from Sellafield Ltd to ensure that it met all of their stringent specifications.

As part of an ongoing programme to increase resistance to earthquake damage the new unit also had to be assessed and approved for seismic resistance. Sellafield Ltd conducted a detailed survey of the new steam plant and were involved at every stage of engineering and manufacture so that they could carry out checks and calculations to ensure that their strict seismic requirements were complied with in full.

As well as efficiency and safety advantages it is possible to start-up and produce steam within five minutes from a completely cold condition. This is possible due to the forced circulation helical coil concept.



Water is pumped through the heating coil in the opposite direction from the hot burner gasses to maximise efficiency. The outlet from the coil is then directed to a high efficiency vortex separator which produces very dry steam.

The system supplied to Sellafield Ltd is an ideal means of meeting the requirements for a readily available steam source which is safe, reliable and able to withstand a seismic event.