Stone & Webster—Centralia, Washington, USA

TransAlta Corporation, Big Hanaford Power Station

Project Description

The Big Hanaford Power Station was built in 2002 to provide power for the Washington state grid. The 228 MW combined cycle plant is optimized to achieve a schedule of daily start-stops, without requiring additional capital investment or loss of operational efficiency.

IST was contracted to supply four (4) OTSGs for the Big Hanaford Power Station. The four (4) OTSGs were built with HP and LP steam circuits, and also included SCR and CO systems for emissions control. The plant also features four (4) x 43 MW LM6000 gas turbines and two (2) x 28 MW steam turbines.

The customer selected OTSGs because they are ideally suited for cycling applications due to the elimination of drums and other thick-walled pressure parts. The thin-walled tube design and high-grade tube material permits regular start-stop operation without the thermal stress concerns usually associated with drum-type HRSGs.

OTSGs are capable of extremely fast start-ups and are typically able to supply full steam loads within 60 minutes. Since OTSGs start from a dry condition, there is no requirement to slowly heat the water contained within drums. The fast start-up of OTSGs allows both the gas turbines to reach full load much quicker than traditional drum HRSGs.

OTSG Common Benefits

IST's unique Once Through Steam Generators are designed to run dry, eliminating the need for bypass stacks, diverter valve systems and stack silencers. OTSGs have once through flow paths; therefore no steam drums or blowdown systems are required.

The absence of drums and the modular design and manufacture of OTSGs facilitate easy and rapid shipment and erection of the units. Each unit at Centralia was mechanically installed on site within three to four weeks and required approximately 3000 installation man-hours.

Each unit consists of five modules: inlet duct, plenum, steam generator module, hood, and the stack, which reduce erection time and crane requirements. The use of small diameter tubes and modular construction allow for a lightweight and compact design that is suited for projects that have weight and size restrictions.

OTSGs demonstrate a significant improvement over natural circulation drum-type units. They offer high availability, high efficiency, simple operation, dry running, and the lowest installed and life cycle costs in the industry.

CONTRACT SUMMARY

Gas Turbine	Turbine Output (MW)	Exhaust Weight (lbs/hr)	Fuel	Exhaust Temp. (°F)	Firing Temp. (°F)	Feedwater Temp. (°F)
LM6000	43	965,200	Natural Gas	869	1051	122

HP Steam Flow (lbs/hr)	HP System Pressure (psia)	HP Temp. (°F)	LP Steam Flow (lbs/hr)	LP Steam Pressure (psia)	LP Temp. (°F)	OTSG Total Heating Surface (sq ft)
129,100	1562	974	31,050	113	400	428,843