Black Hills—Las Vegas, Nevada, USA

Black Hills Energy, Las Vegas Cogeneration II

Project Description

The Las Vegas Cogeneration II plant was built in 2001 to provide peak power for the Las Vegas area. The 228 MW combined cycle plant is optimized to achieve a daily start-stop schedule, without requiring additional capital investment or loss of operational efficiency.

IST was contracted to supply four (4) OTSGs for the Las Vegas Cogeneration II plant. The 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 Dresser Rand steam turbines.

OTSGs are ideally suited to 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 at full load 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 the gas turbines to reach full load much quicker than 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 unit. 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, proven experience, and cost saving benefits.

CONTRACT SUMMARY

Gas Turbine	Turbine Output (MW)	Exhaust Weight (lbs/hr)	Fuel	Exhaust Temp. (°F)	Firing Temp. (°F)	Feedwater Temp. (°F)
LM6000	43	987,516	Natural Gas	843	NA	89

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)
95,000	755	770	28,028	90	406	418,616