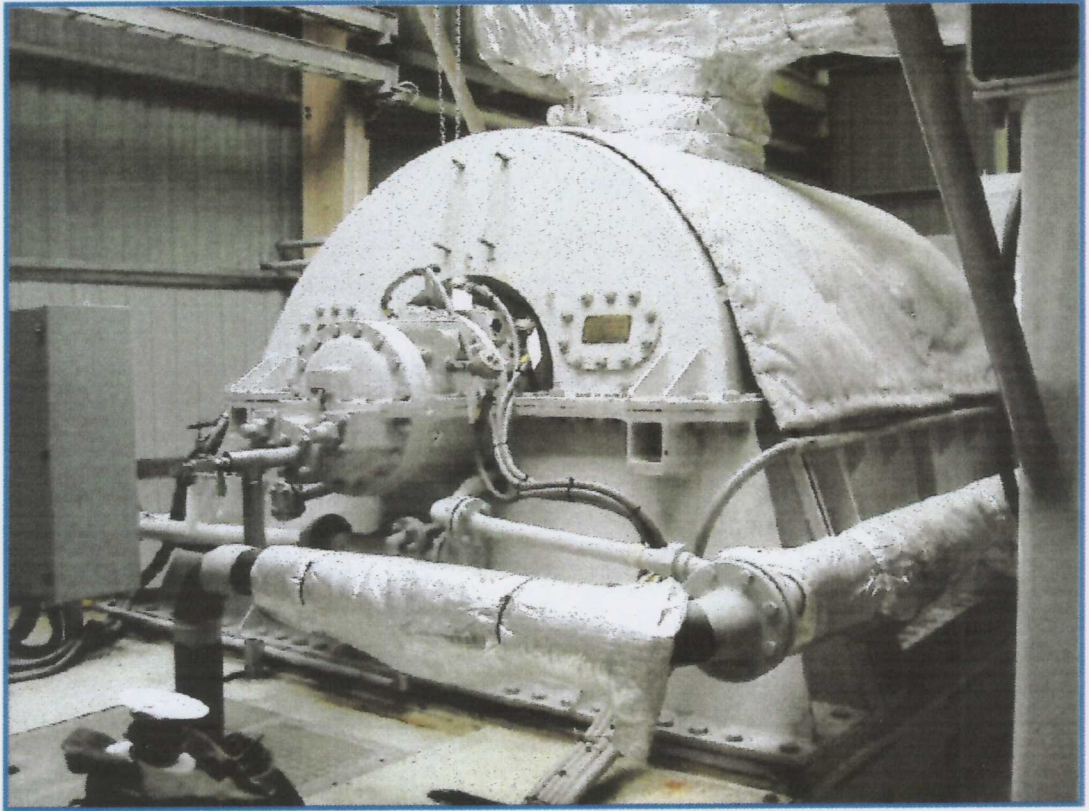




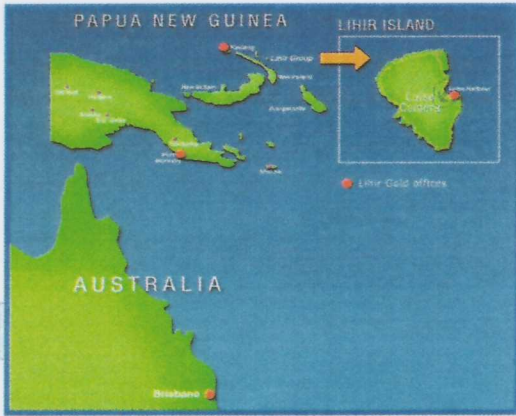
Geothermal Development Associates



Lihir 6 MW Non-Condensing Geothermal Power Plant

Lihir Island, Papua New Guinea





Lihir Gold Limited (LGL) operates one of the world's premier gold mines on Lihir Island, Papua New Guinea. In 2001, LGL contracted with GDA to supply a 6.0 MW non-condensing geothermal plant. LGL is working to increase their use of renewable geothermal energy and reduce the need for heavy fuel oil typically used to power the mine, processing facilities and villages.

Lihir 6 MW Geothermal Power Plant — At the heart of the 6.0 MW plant is a marine propulsion turbine, originally manufactured by GE for the US Navy. These turbines are specially modified to upgrade materials and performance, resulting in a simple, rugged machine ideally suited to the rigors of geothermal service.

GDA specializes in packaging these turbines with high quality components from key vendors. All the major component vendors have been with GDA for multiple projects, and are intimately familiar with our needs. Together, the team is capable of delivering a plant to port in as little as seven months.

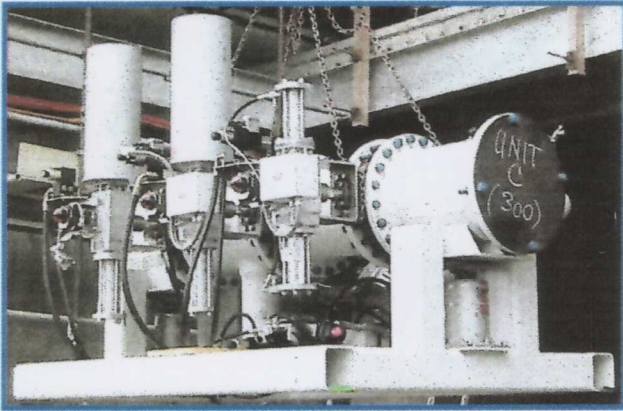
The simplicity and quick delivery of the GDA non-condensing plant make it an ideal choice for initial production during development of large fields, or even in locations with limited markets for power.



Powerhouse under construction showing the turbine and pressure balanced inlet elbow, and inlet steam valve maintenance platform. The atmospheric exhaust duct can be seen in the lower foreground.



View of Louise Harbor on Lihir Island from the original location of the 6.0 MW Project. The Lihir Gold Mine Processing Plant is shown in the background which includes a seaport, 60 MW diesel power generating plant, and one of the world's largest oxygen generation plants.



GDA factory assembles and tests the turbine inlet piping assembly, complete with steam control valves. This photo shows the robust hydraulic actuators that power the valves.

GDA supplied a prefabricated control building housing the PLC-based controls, motor control center, medium voltage switchgear, batteries and chargers, and panelboards. Auxiliary equipment supplied included the lube oil console, lube oil cooler, and hydraulic power unit.

System Specifications	
Steam Flow	100,000 kg/hr
NCG	3.5% by weight
Turbine Inlet Pressure	5.0 bar abs
Turbine Exhaust Pressure	Atmospheric, 6m AMSL
Turbine Inlet Temperature	152°C (dry saturated)
Gross Generator Output	6,000 kW
Component Descriptions are as follows:	
Steam Turbine	GE low-pressure double-flow turbine modified for geothermal service
Generator	Ideal Electric 7,500 kVA, 6,000 kW, 11kV, 50Hz 4 pole synchronous, TEWAC
Speed Reduction Gear	Lufkin Industries, N21C, double helical parallel shaft

Photo of the original Lihir 6.0 MW Project Site showing one of the production wells during resource testing. The powerhouse is in the background.

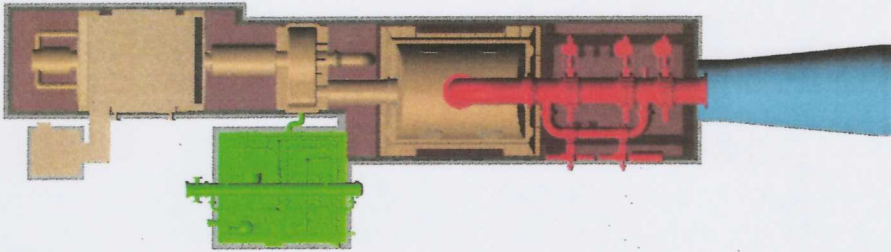
In 2006, the 6 MW unit was relocated from its original site to make way for mining. The unit is now back in operation at a new location, closer to the harbor.



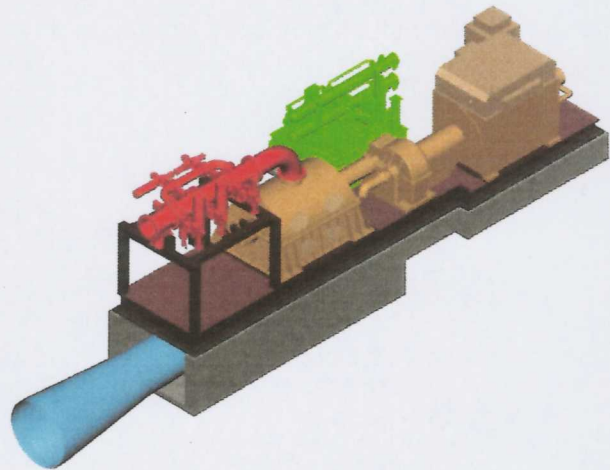
Geothermal Development Associates (GDA) is a US company, experienced in geothermal power projects worldwide. GDA has a core group of engineers, geoscientists and support staff. Our project teams regularly include highly experienced consultants and companies purposely selected to fit client and project needs.

Since the company's incorporation in 1978, GDA has been active as a consultant to the private and public sectors in all phases of geothermal project development for both power generation and direct use. In 1985, GDA, in the role of developer, brought on-line the Steamboat 5.0 MW binary power plant near Reno, Nevada, one of the earliest geothermal power projects in Nevada.

For nearly 20 years GDA has been associated with Geothermal Power Company, the supplier of the rugged US Navy turbines used in the turbine generator sets now operating on Lihir Island.



GDA offers a compact, complete, straight-forward non-condensing 6.0 MW plant with a robust turbine, quality components, and quick delivery.



Geothermal Development Associates

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