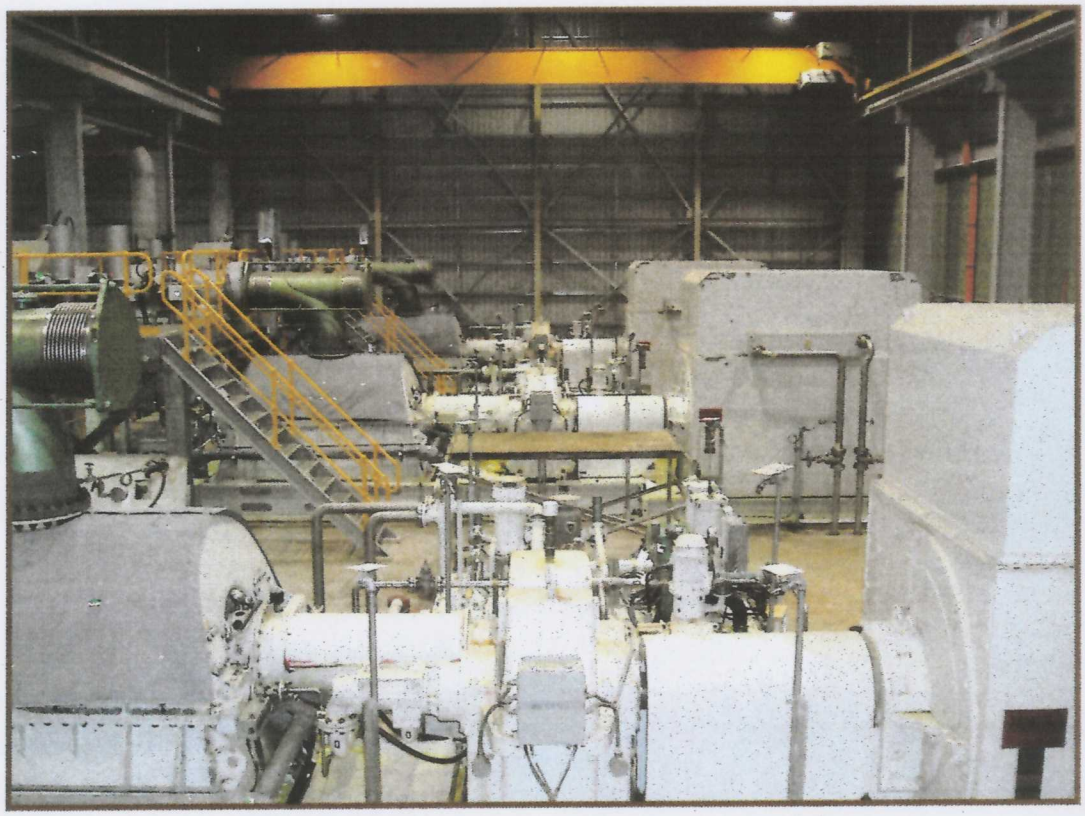
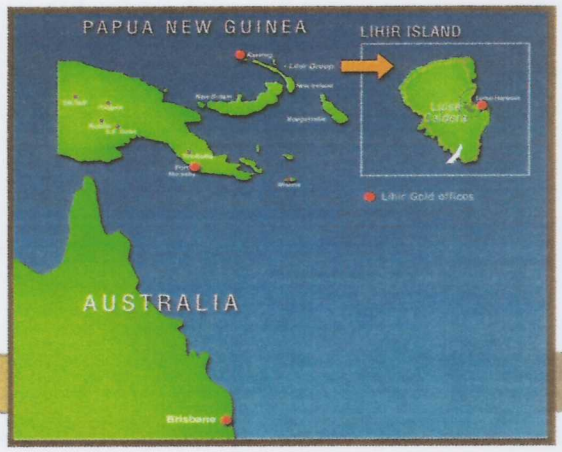
Lihir 50 MW Geothermal Power Plant

Lihir Island, Papua New Guinea



Geothermal Development Associates

Lihir Gold Limited (LGL) operates one of the world's premier gold mines on Lihir Island, Papua New Guinea. In 2003, LGL contracted with GDA to supply a 30 MW single flash condensing geothermal plant as part of a plan 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. Due to the success of that project, LGL contracted with GDA in 2005 to add a 20 MW extension to the power plant, yielding 50 MW of total output from five identical units.



Lihir 50 MW Geothermal Power Plant — At the heart of the 50 MW plant are five marine propulsion turbines, 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.

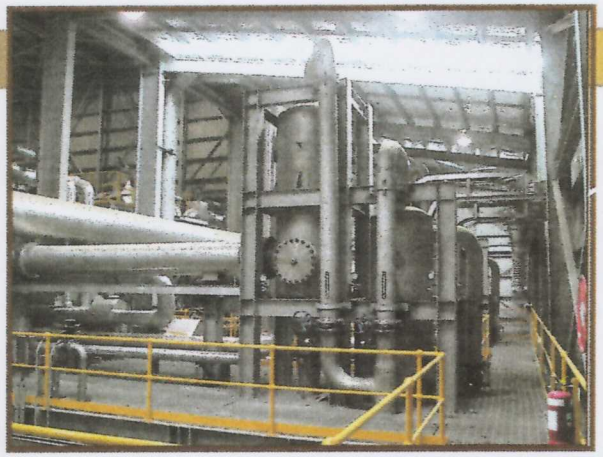
GDA specializes in packaging these turbines with high quality components from key vendors. GDA provided all of the major components for the project, including five units each consisting of:

- *11 MW turbine-generator set*
- *direct contact condenser*
- *main and auxiliary cooling water pumps*
- *two-stage steam jet ejector vacuum system*
- *counterflow fiberglass cooling tower*

GDA provided all turbine-related control valves, including the hydraulic power system, and the lube oil consoles. The balance of plant, provided by the installation contractor, included all necessary interconnecting systems, such as piping and electrical service.

Delivery of the components within GDA's scope for these two projects took just seven months from notice to proceed to arrival at US port. The 20 MW extension was commissioned in early 2007.

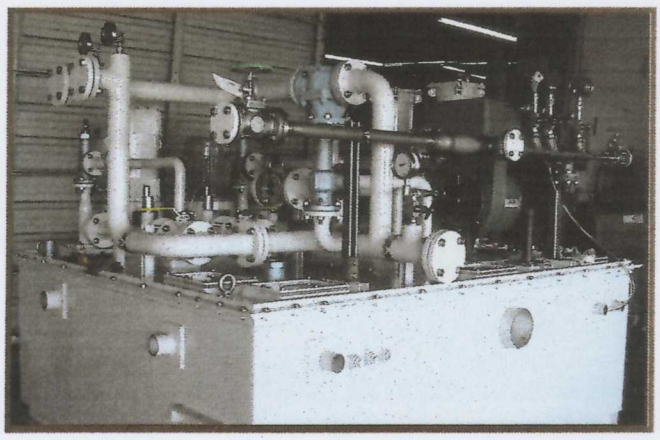
GDA supplied a six-cell counterflow FRP cooling tower for the initial 30 MW plant. An additional four-cell tower for the 20 MW expansion is shown under construction.



Vacuum system components provided by GDA included a Graham two-stage steam jet ejector, intercondenser, and aftercondenser for each 11 MW unit.

System Specifications	
Steam Flow	100,000 kg/hr
NCG	3.5% by weight
Turbine Inlet Pressure	5.0 bar abs
Condenser Pressure	135 mbar abs
Turbine Inlet Temperature	152°C (dry saturated)
Gross Generator Output	11,438 kW
Component Description as follows:	
Steam Turbine	GE low-pressure double-flow turbine modified for geothermal service
Generator	Ideal Electric 13,750 kVA, 11,000 kW, 11 kV, 50 Hz 4-pole synchronous, TEWAC
Speed Reduction Gear	Lufkin Industries, N24C, double helical, parallel shafts
Condenser	Graham Corporation direct contact with integral gas coolers and pump suction chambers, 316L SS
Gas Extraction System	Graham Corporation 2-stage steam jet ejectors with direct contact inter- and after- condensers, 316L SS
Cooling Tower	Cooling Tower Depot induced draft, counter flow, FRP cooling tower - 10 cells back to back (2 per unit)

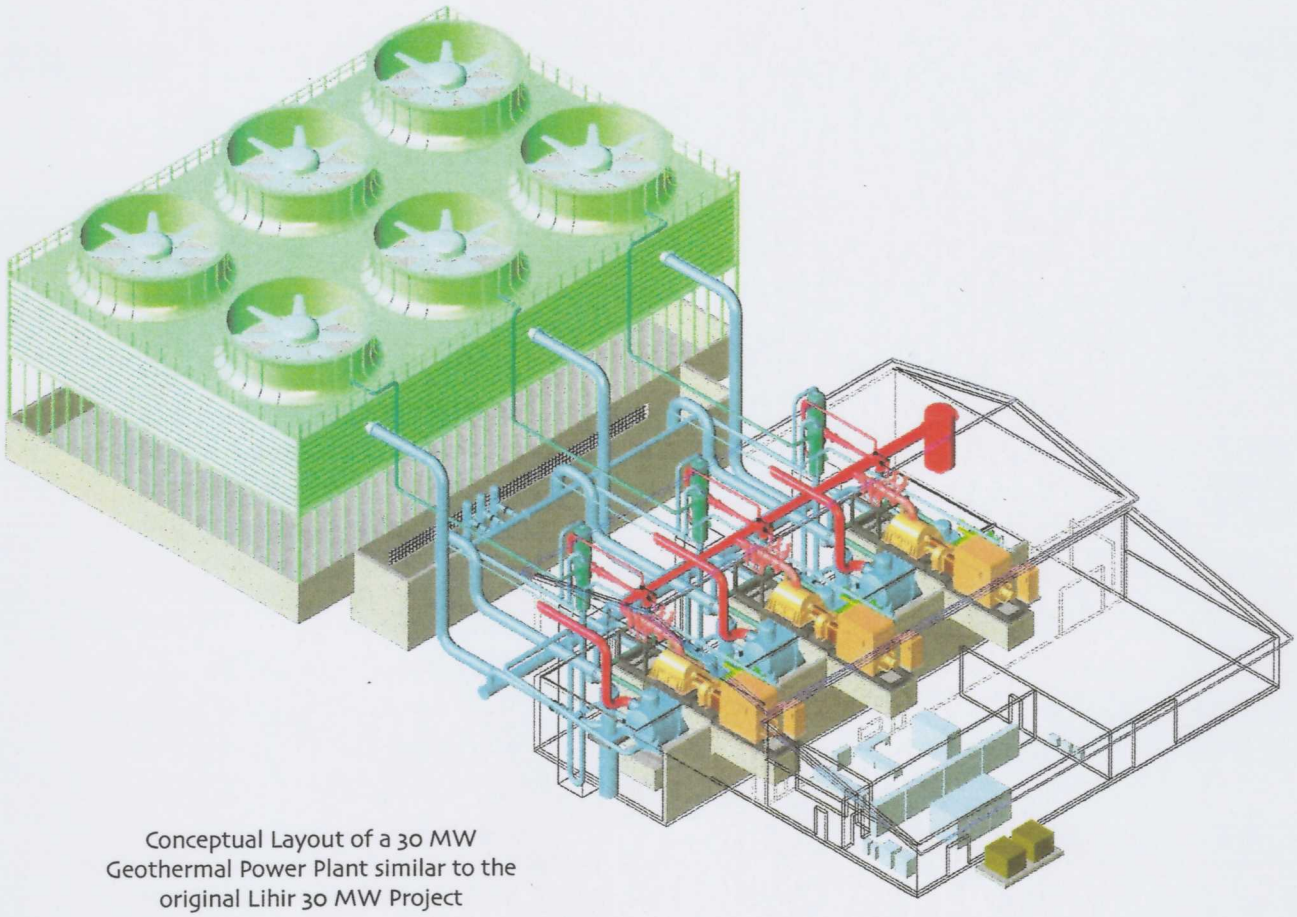
GDA manufactures its own lube oil consoles to ensure the utmost in quality and function.



Geothermal Development Associates (GDA) is a U.S. company, experienced in geothermal power projects worldwide. GDA has a core group of engineers, geoscientists and support staff. Our project teams 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.



Conceptual Layout of a 30 MW Geothermal Power Plant similar to the original Lihir 30 MW Project

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