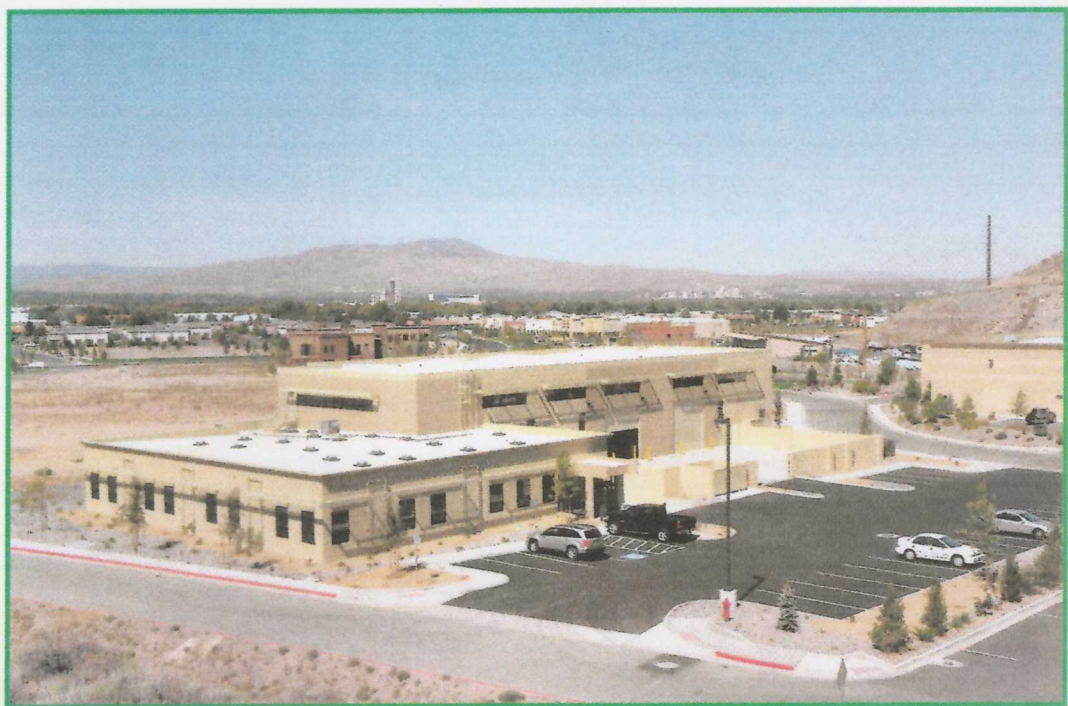




Geothermal Development Associates



Technical Capabilities

**Geothermal Resource Exploration to
Power Plant Design & Equipment Supply**

from resource to market

Geothermal Development Associates (GDA) is a privately held U.S. corporation with 35 years of experience in geothermal resource, power and direct use development. Our core group of engineers, geoscientists and support staff is experienced in planning and overseeing geothermal projects – from early resource assessment, feasibility study, risk assessment and mitigation, supervision of incremental stages of exploration, drilling and well-testing, to design, procurement, packaging, shipment, testing and commissioning of a new power plant. To compliment our expertise, we have developed trusted working relationships with other experts within our industry.

Since the company's incorporation in 1978, GDA has provided a broad range of services for a variety of geothermal projects, both domestic and international. GDA serves as a lead consultant and provides valuable assistance in power purchase agreement negotiations, lease or concession acquisitions, and permitting, including sensitive environmental, cultural, and political matters.

Resource Assessment, Exploration & Development

GDA's geothermal resource development team is overseen by the President of the company, G. Martin Booth III, with project management under the direction of the Chief Geologist, Richard "Rick" Zehner. Both are exploration geologists, with a combined 85 years of experience in the geothermal, minerals and oil industries.

Successful geothermal resource development follows a cost-effective, stepwise approach using the least costly exploration methodologies in the earlier stages, incrementally more costly methodologies as a guide and basis for the next stages, and ultimately leading to deep drilling, the highest cost program. The GDA resource team coordinates geological, geochemical, geophysical, and drilling programs through all stages of exploration and development.

- **Property Acquisition**
Use of desktop GIS for regional resource targeting; preliminary project due diligence; Lease or concession acquisition
- **Phased Exploration**
Planning and supervision of coordinated geological, geophysical, geochemical and hydrological studies and surveys
- **Drilling & Well-Testing**
Phased programs to fit project conditions: temperature gradient holes; exploration test and confirmation wells; production and injection wells, each flow-tested with reservoir engineer supervision and reporting



GDA utilizes state-of-the-art software to integrate and analyze exploration data, and to export this information onto maps and graphs for geoscientists, engineers, and management end-users. By retaining datasets that can be continually upgraded with new data, we are able to reinterpret hydrologic and geologic models to ensure success on a least-cost, on-schedule basis.



Project Feasibility and Analysis

Early identification of existing and potential threats to the success of a project is of paramount importance to the investor and developer. GDA has extensive experience in project development, not only in risk of a sub-economic geothermal well, but equally so in nontechnical issues such as those associated with environmental, cultural, political, and economic matters.

- **Project Feasibility**

The GDA engineering and geoscientist team provides expert project technical and economic evaluation and analysis from the earliest conceptual stage through financing, construction and power plant commissioning. GDA's experience in the industry has given us a database from which capital and operating costs can be rapidly determined. Our pro forma model is the tool developers need in order to structure a project to obtain both a power purchase agreement and project financing.

Permitting and Approvals

The process of obtaining permits and approvals plays a major role in each project. Successful permitting is key to maintaining the project schedule, and thereby controlling costs. Technical requirements must be defined within the existing social framework through awareness, sensitivity, and cooperation. In all phases of a project, the experience of GDA's geoscience and engineering staff is invaluable for properly dealing with the environmental, cultural, health, safety and other factors associated with permitting. GDA has also assumed the lead role in permitting at the federal, state and local levels for all types of geothermal projects.

Power Plant Experience

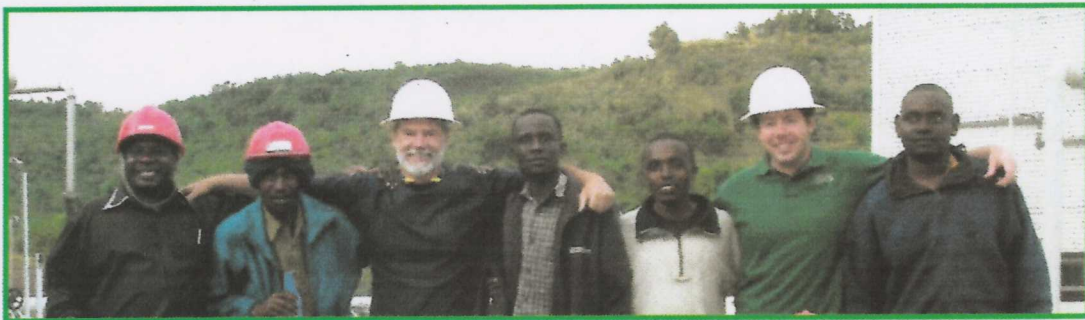
GDA's experience with geothermal power plants began in the mid 1980s, and continues under the guidance of VP of Engineering, David L. Mendive, P.E., with project management by Lawrence H. Green, P.E. Their continued oversight has been vital to the growth and success of our power projects over the years. The engineering staff has diverse and in-depth experience in both binary and steam installations, domestic and international. GDA has been involved in plant operations, troubleshooting of operating installations, upgrading electrical systems, major plant rehabilitation of binary and steam units and ancillary components, and power plant equipment design and supply.



Power Plant Design & Supply

GDA's engineering team utilizes current technology to analyze and evaluate available geothermal resources to maximize power plant efficiency and dependability. By identifying the characteristics of the resource such as temperature and flow, GDA can determine the power generation potential and recommend a plant design that will best suit the project. This process includes thermodynamic, heat transfer and fluid dynamic modeling to design various systems. The output from these models is then used to determine project and equipment specifications.

GDA designs and packages turbine generator sets together with associated components such as lube oil consoles, hydraulic power units, plant air systems, remote control panels, motor control centers, and other plant components as required by our customers. GDA packages the TG sets on heavy steel bedplates or skids to simplify field installation. No two power plants are the same, as each one is tailored to meet the specific needs of the customer. Shop alignment and extensive testing are conducted prior to shipment in order to further simplify installation. GDA then provides technical support and supervision during installation and commissioning.



- **Power Plant Design**
Individually designed to be economical and make optimal use of the geothermal resource
- **Power Plant Packaging & Supply**
Turbine generator sets with associated components packaged into easily installed modules
- **Manufacturing**
Turbine auxiliary systems including lube oil systems, hydraulic power units, and remote control systems
- **Installation and Commissioning Support**
On-site support to ensure correct installation and commissioning
- **Operator Training**
Training of plant operators in proper operation, monitoring, and maintenance

In December 2010, the US Department of Commerce honored GDA with an Export Achievement Certificate recognizing our accomplishments in the global marketplace. Power plants designed and supplied or rehabilitated by GDA are currently operating in Papua New Guinea, Ethiopia, and Kenya.

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