

## **SERVICE LEVELS FOR DRILLING OPERATIONS**

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In many of the drilling projects we support, GeothermEx provides a basic package of technical services. These include drilling engineering (including well design and technical oversight of the drilling operation), assistance in specification and procurement of materials and services, assistance in identifying possible drilling contractors, preparation and negotiation of drilling contracts, assistance in permitting and regulatory compliance, wellsite geology, planning supervision of logging and testing, and fluid sampling. Many clients favor this approach, because it allows our expertise to be applied where it is most needed, while procurement and operational management of the job can be handled directly by the client.

We have provided this basic package of services in numerous geothermal projects. Recent examples include PacifiCorp's expansion of the Blundell project at Roosevelt Hot Springs (Utah) and Western Geopower's development at The Geysers. Typically we have a GeothermEx representative on-site at all critical times during drilling operation; at any given time this person may be a wellsite geologist, geochemist or well-test engineer, depending on the activity. In addition, our drilling engineer visits the site routinely to interface with the drilling supervisor and staff to maintain quality control and avoid cost over-run and technical problems. Various specialists are also involved before and after drilling for planning, assistance in procurement and permitting, analysis and reporting, on an as-needed basis.

The next level of service we can provide consists of overall management of the operation. In this package, we provide more complete procurement and contracting services, and on-site supervision of the drilling operation. We can oversee all activities such as solicitation, review and finalization of contracts for services and materials, development of drilling permits and most other regulatory compliance documentation, and day-to-day supply of services and materials to the drilling site. For this we provide a drilling supervisor throughout the operation, and either the same supervisor or a procurement specialist on a full-time basis for up to several months before the operation starts, plus participation by our specialists at various critical times, at a higher level than that provided for the basic package. The drilling supervision and procurement people need to be contracted specially for the job, so this approach is somewhat more expensive if we provide them than if they are contracted directly by the operator. However, we have managed a number of drilling operations in this way, including NCPA at The Geysers (14 wells), Miravalles in Costa Rica (more than a dozen wells), Gerlach (Nevada) and Vale (Oregon), and over the past several years we have managed the drilling of several high-temperature wells on the island of São Miguel in the Azores using this approach.

Finally, on a number of projects we have served as prime contractor, taking financial as well as technical responsibility for both procurement and management of the drilling operations. We have done this in major drilling operations for Mission Energy at the Aidlin project at The Geysers (six wells), Los Angeles Department of Water and Power at Coso (three wells), Barnwell Industries at Puna in Hawaii (several wells), and Ore-Ida Foods (Ontario, Oregon, one

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well), plus various other clients in smaller drilling operations. In this approach, we charge a mark-up on procured services and materials to cover our financing and insurance costs and risks; it therefore is the most expensive approach, but provides the most complete level of service.

Within this general framework, we can develop the best package of services to ensure the most reliable and cost-effective drilling operations for our clients.