



**DOING THINGS  
THE RIGHT WAY  
FOR OVER  
35 YEARS.**

[ruendrilling.com](http://ruendrilling.com)

(800) 322-3201

# RUEN DRILLING GETTING MORE DONE IN MORE PLACES MORE EFFICIENTLY

Ruen Drilling is a family-owned company that began in the Idaho and Montana mining districts back in the 1970s. From there, Ruen Drilling has expanded with thoughtful, measured growth to keep us closely tied to a traditional work ethic, and to assure that our clients receive the best quality of services.

Today, we operate a fleet of modern hydraulic wire-line core drilling equipment throughout the US and abroad. Though we still hold fast to our small-company integrity and values, we have developed a reputation for quality work and made our mark around the world.

The key to our success is great people, intelligent approaches, well-maintained equipment, and targeted experience in a vast range of drilling circumstances. A fair measure of bold thinking hasn't hurt either, and has taken us to impressive projects like the Mariani Tunnel geotechnical investigation in Puerto Rico, and challenging markets in the Far East and Latin America where we now have business entities. Our clients like the personal attention and genuine interest they get from Ruen Drilling. Thanks to our conscientious employees, our safety record is outstanding. We are happy to provide references and insurance data.

This formula has worked very well over 35 years.

Still, the best measure of how serious we are about maintaining overall quality standards is our work. Take a look at some of our recent projects, and you'll see what we mean.



# SELECTED CASE STUDIES

## AZTECA GOLD CORPORATION

**Two Mile Project located in the Silver Valley of Idaho**

Ruen Drilling was asked to drill a series of deep core holes beneath known mineral deposits in the Silver Valley mining district. Work began in July 2008 in order to confirm the existence and extent of deeper mineralization. Drilling proceeded on one of the holes to approximately 11,340 ft. very possibly the deepest core hole ever drilled in North America. Ruen crews operated two new Boart LF230 core drills, 24 hours a day, from start to finish using V-wall lightweight drill rods. Special bits and an engineered low solids polymer based drilling fluids system were incorporated in the drilling campaign. From day one Azteca and Ruen personnel worked together to ensure no lost time accidents and to comply with the required permitting regulations.

**Client: Azteca Gold Corporation**

## CALDECOTT TUNNEL IMPROVEMENT PROJECT Oakland, California

Drilling results were the basis for a Geotechnical Baseline Report (GBR). Drilling included horizontal and angle HQ3 core holes to depths of over 900 feet (270 meters) each. Geotechnical aspects of the rock including RQD, bedding, fracture patterns, presence and flow rate of groundwater were reported. Ruen's work on this project was designed to contribute to an accurate construction bid. In general, the more complete the characterization drilling program, the fewer change orders for "changed ground conditions" will follow.

**Client: Caldecott Tunnel Improvement Project**  
**Consultant: Geomatrix Consultants, Oakland, CA**



## VULCAN POWER COMPANY GEOTHERMAL RESOURCE EVALUATION

**Near Fallon, Nevada**

Geologic conditions and client's needs required deep core recovery in a series of geothermal core holes. These were hybrid borings, pre-collared with casing using a rotary drill rig, to top of the basement rock. Experienced Ruen Drill crews were contracted to complete these core holes to depths of approximately 7000 feet, drilling wire line core to TD. Ruen achieved accurate results for data collection to characterize the geothermal reservoir, and recovered core for additional exploration study at a cost savings to the client. With crews trained and experienced in geothermal hazards and blowout prevention, this project was completed in a safe, timely manner.

**Client: Rocket DrillCo**



# EQUIPMENT

## **Boart Longyear LF-230 Qty: 4**

Truck-mounted. P-size head and chuck, 40,000 lb. hoist. Angle capability. Hole depth: NRQ-Vwall 11,000' HRQ-Vwall 6,500'

## **Diversified Machine Works DMW-100 Qty: 1**

Truck-mounted. P-size head and chuck. 20,000 lb. hoist. Angle capability. Hole depth: NRQ-Vwall 4,200' HRQ-Vwall 3,600'

## **Boart Longyear LF-90 Qty: 2**

Truck-mounted. P-size head and chuck, upgraded to 20,000 lb. hoist. Angle capability. Hole depth: NRQ-Vwall 4,200' HRQ-Vwall 3,600'

## **Sandvik (UDR) DE-710 (UDR-200) Qty: 1**

Track-mounted. P-size head and chuck, 17,000 lb. hoist. Angle capability. Hole depth: NRQ-Vwall 3,300' HRQ-Vwall 2,500'

## **Christensen CS1500 Qty: 2**

Truck-mounted. P-size head and chuck. Angle capability. Tier III engines. Hole depth: NRQ-Vwall 3,000' HRQ-Vwall 2,500'



## **Christensen CS1000 Qty: 1**

Track mount. Upgraded 14,000 lb. hoist. P-size head and check. Horizontal and angle capability. Tier III engine. Hole depth: NRQ-Vwall 3,000' HRQ-Vwall 2,500'

## **Boart Longyear LF-70 Qty: 4**

Track/trailer/heli portable. Upgraded 14,000 lb. hoists. Angle capability. Tier III engines. Hole depth: NRQ-Vwall 2,500' HRQ-Vwall 2,800'

## **Boart Longyear LY28 Qty: 1**

Skid/heli portable. Hole depth: NRQ-Vwall 1,000'

## **Central Mine Equipment CME-850 Geotechnical Drill Qty: 1**

Track-mounted. Auger/Casing Advance/HQ-3 capabilities  
Hole depth: HQ-3 650'

## **Brainard Kilman BK-66 Geotechnical Drill Qty: 1**

Truck-mounted. Auger/Casing Advance/HQ-3 capabilities  
Hole depth: HQ-3 500'

## **Central Mine Equipment CME-45 Geotechnical Drill Qty: 1**

Skid/heli portable. Auger/Casing Advance/HQ-3 capabilities.  
Hole depth: HQ-3 200'



**PARTIAL CLIENT LIST** ASARCO Core drilling, mineral exploration AMEC Geotechnical drilling, mine tailings evaluations in US and Peru American Bonanza Surface mineral exploration Bechtel Corporation Helicopter-supported geotechnical core drilling Brierley Associates Geotechnical drilling, coring, packer testing CH2M Hill Geotechnical drilling, casing advance, coring, piezometers City of Los Angeles Geotechnical drilling, core drilling, monitoring wells Compania Minera Antamina S.A. Groundwater wells and exploration, Peru Entree Gold Remote mineral exploration Evolving Gold Multi-rig operation for mineral exploration GCE Helicopter-supported steered horizontal bore holes, Hong Kong GEI Consultants, Inc. Geotechnical drilling, coring, packer tests Geo Practica Inc. Horizontal borings, PR-53 Tunnel Project, Puerto Rico Golder Associates, Inc. Geotechnical drilling, US and Peru Kiewit Pacific Company Rock quarry investigation, core drilling, Mexico Kinross Gold Kubaka Mineral exploration, Eastern Russia Kleinfelder Geotechnical drilling, coring, hollow stem auger sampling Lachel Associates Geotechnical coring, piezometers, packer testing Law/Crandall, Inc. Geotechnical drilling, instrumentation installation Metropolitan Water District of Southern California Geotechnical drilling Minera Yanacocha S.A. (Newmont) Exploration drilling, Peru and Bolivia Phelps Dodge Mining Company Mineral exploration, core drilling Respec Geotechnical drilling, horizontal coring for tunnels San Diego County Water Authority Geotechnical drilling, core drilling Shannon & Wilson, Inc. Geotechnical drilling, core drilling Stillwater Mining Underground confirmation drilling Terracosta Consulting Group Geotechnical core and drilling U.S. Army Corps of Engineers Geotechnical drilling U.S. Forest Service Geotechnical drilling URS Geotechnical drilling for dams and tunnel baseline reports

# CAPABILITIES

## DEEP HOLE CORE

Recent additions of four new Boart LF230 deep hole core rigs have increased the dimension of drilling services Ruen now offers. Experienced crews have drilled to well over 11,000 feet, reducing from H to N size core at 6,500 feet.

Deep core drilling is manned by three rotating crews and full-time onsite supervisors. Ruen has the auxiliary equipment to perform highly sophisticated drilling over relatively long periods. Supervisors and drillers are certified and licensed as required. In more than 35 years in business, Ruen has developed a corporate culture of employee safety, accountability and pride of workmanship, all crucial attributes on challenging and technical drilling programs.



## GEOHERMAL EXPLORATION

Geothermal is emerging as a viable industry in the renewable energy sector, since it provides an economical source of power 24 hours a day throughout the year. Parts of Washington, Oregon, Idaho and Utah in particular are proving to be vast economic geothermal resources, along with the historical centers of power generation in California and Nevada.

Ruen is utilizing the Boart LF230 deep core drills for geothermal exploration. Our crews are familiar with and trained in the use of hazard prevention and blowout prevention. Exploration holes as deep as 7,000 feet have been drilled at a cost savings relative to larger volume rotary slim hole drilling. Core drilling may be cost effective for temperature gradient holes in areas of difficult drilling conditions. Additional benefits of coring slim holes for geothermal exploration include:

- Confirmation of downhole temperatures and pressures
- Fracture and structure orientation
- Angle drilling capable
- Continuous core for laboratory testing
- Selected fluid sampling for geochemical evaluation

Core drilling operations require much less site preparation and lower mobilization costs than larger rotary rigs. Core drilling fluids systems involve much smaller volumes, and thus typically reflect lowered impact and cost. Zones of lost circulation may be easier to tackle with core drilling technology.



### **Lehigh/Hanson Permanente Limestone Quarry, California**

"The drilling project was very complicated, involving very limited level areas in steep mountainous terrain supporting high populations of rattlesnakes and mountain lions; an environmentally sensitive area with all roads, drill pads and construction subject to the approval and ongoing monitoring of a staff of biologists. Further, the complexity of the geology – two miles east of the San Andreas Fault, with very heavily fractured rock, landslide debris and fault breccias of soft, wet clay – made it almost impossible to predict the geology underlying any drill hole. Despite the tough conditions, your drillers maintained a positive, professional attitude and consistently outperformed competitors' rigs. Your company and personnel are the best I have worked with on any project. The professionalism, knowledge and skill of your drillers made an exceptionally tough project doable. I recommend Ruen to anyone who needs drilling performed."

**Robert S. Fousek, President, FMR Inc.**

**Registered Professional Geologist, Alabama, Georgia and Tennessee**

### **Entrée Gold Diamond Drill Project, Lordsburg, New Mexico**

"Startup was extremely smooth... all of the crews have been hard-working, experienced and a pleasure to work with. The project entailed drilling angle and vertical holes to depths of 2,500 feet. In the most recent drill period, drilling rates have averaged close to 200 feet per day, with individual 12-hour shifts of 200 feet or more. Throughout the program, core recovery has been excellent. Shift reports are completed and delivered in a timely manner, drill sites are kept clean and core is handled properly. Invoices and backup documentation are well organized, making the approval process relatively easy. I am please to say that this has been one of the best drilling programs of my career."

**Thomas A. Watkins, Exploration Manager, Americas**

**Entrée Gold**

### **San Vicente to Second Aqueduct Project, San Diego**

"Ruen Drilling performed beyond our expectations. Work plans were well organized and followed during the execution of the work. Virtually no lost time resulted from logistical concerns, and the project was completed under budget and on schedule. You dedicated two of your senior people to this job, who explained procedures in detail and maintained excellent communication with our field people as well as the client representatives. We will consider your company strongly for upcoming geotechnical drilling and sampling."

**Gregg Sherry**

**Brierly Associates**

### **Riverside Badlands Tunnel Project**

#### **Hollywood Water Quality Improvement Project, Lake Mathews Outlet Facilities Project**

"For this 8-mile-long tunnel project in southern California for the Metropolitan Water District, a total of about 10,000 feet of core drilling was performed. Drilling conditions were varied and locally challenging, including soil, soft rock, and hard rock. Your crews handled the drilling challenges well, while achieving both excellent core recovery and advance rates. Following your excellent performance on the Badlands Tunnel project, you worked with us and the LA Department of Water and Power on the investigation for the Hollywood Water Quality Improvement Project (various tunnels and large underground tanks). Again, your expedient, high-quality work helped make the investigation a success. Most recently, we enjoyed your excellent support on the geologic investigation for the Metropolitan Water District's Lake Mathews outlet facilities project, including tunnels, a shaft and an offshore outlet tower excavation where both land-based and offshore core drilling was required. I have recommended your firm to several clients and other engineering and geological consultants."

**John T. Waggoner, Principal**

**GeoPentech**



**Mailing Address:**  
Ruen Drilling, Inc.  
P.O. Box 267  
2320 River Road  
Clark Fork, ID 83811

**Toll Free: (800) 322-3201**  
**Phone: (208) 266-1151**  
**Fax: (208) 266-1379**  
**Web: [www.ruendrilling.com](http://www.ruendrilling.com)**  
**Email: [office@ruendrilling.com](mailto:office@ruendrilling.com)**

**Ruen Drilling International**  
**Peru Branch**  
**Tel: 51-1-255-0755**  
**Fax: 51-1-254-9436**  
**Web: [ruendrillingperu.com](http://ruendrillingperu.com)**