## RAG.ENERGY.DRILLING



# Well Engineering

ENGLISH

# Company profile RAG.ENERGY.DRILLING

The energy supply for Europe is facing major challenges. To ensure a reliable supply of energy, high technical and economic know-how and innovative ability are an important prerequisite.

For many decades to come therefore, the exploration for, and production of traditional energy sources such as natural gas and oil plays an important role. Added to this is the increasing use of geothermal energy. The basis is a high level of competence in the area of "deep well drilling". To meet these future demands better RED is able to offer the market the know-how of drilling and measurement techniques built up over 75 years. Therefore on January 1st 2014, RAG Rohöl Aufsuchungs Aktiengesellschaft created the 100% owned daughter company RAG Energy Drilling GmbH (RED).

The aim of the new company, RAG Energy Drilling, is to implement a reliable partner for our customers drilling projects.

The range of consulting services include exploration and production wells for oil, gas, gas storage and geothermal drilling.



## **Premium Partner for Premium Drilling Solutions**

#### stands for:

- Highest quality implementation of drilling projects with modern technology
- Comprehensive range of services project management from conception to completion
- Customized solutions
- Compliance with budgets and time frames
- Highest safety and environmental standards
- International certification (SCC \*\*, ISO 14001)
- Decades of experience
- Implementation of projects on request as a general contractor





# RAG.ENERGY.DRILLING – a reliable project partner

### Track record

To date, the RAG has planned and drilled approximately 1,100 wells, corresponding to a distance of around 2,000,000 meters drilled. By 2014 an average of 13 wells per year were drilled. RAG reached the highest total amount of meters drilled in a year, including contractor rigs, in 2010 with around 66,000m.

Since its foundation, RAG has drilled around 170 wells in Lower Austria, 820 in Upper Austria, 10 wells in Salzburg, approximately 90 in Styria and 12 in Bavaria. In addition to standard oil and gas exploration and production wells and gas storage wells, highly deviated,

Wells spudded per year (1993 – 2014)



horizontal and extended reach (ERD) wells were also drilled. Furthermore, geothermal projects in Fürstenfeld, Munich-Riem and Simbach-Braunau (Bavaria / Upper Austria) and RAG's own deep geothermal well in Neukirchen a.d. Vöckla (Upper Austria). The majority of the Styrian Thermal Baths (Loipersdorf, Blumau and Walterdorf) were discovered and drilled by RAG.

RAG-owned surface test equipment is used in many wells to conduct open hole tests to obtain information on the size of the gas, oil or water resources and therefore determine the economic viability for production.



#### Metres drilled per year (2004 - 2014)

# Team effort

Thanks to the strong in-house support available within our group we can deliver both **modular service packages** and **turnkey projects**. Cutting-edge technology and a highly trained team drive the continuous improvement of our quality, safety and environmental standards. These also benefit from ongoing communication with the relevant public authorities and other stakeholders, and collaborative relationships with contractors and service companies.

The RED well engineering team consists of highly experienced and dedicated drilling engineers, completion engineers and drilling supervisors, who oversee a project from start to finish and provide well planning, project management and drill site supervision services.



## Service portfolio

## **Consultancy and feasibility studies**

The first step in the run-up to a field development project is to agree on the objectives in collaboration with the client, to achieve the optimum technical and commercial solution with respect to the environmental conditions.



#### Hydraulics analysis



Torque and drag analysis

## Design and planning

Drilling site survey

Project scheduling

**Cost estimates** 

**Project organisation** 

Guidance through tendering and contract award procedures

#### **Equipment coordination and procurement**

#### Well planningg

- Offset data acquisition
- Tubing and casing design
- Directional drilling and wellpath planning
- Drill bit and BHA selection
- Hydraulics analysis
- Hole cleaning analysis and optimisation
- Torque and drag analysis
- Well control
- Drilling programme development

#### **Production planning**

- Well completion design and planning
- Artificial lift design and planning
- Well stimulation planning and quality control
- Repair work planning (well integrity)
- Preparation of well treatment programmes

## Official procedures (planning application)

We compile all the documents needed for approval of your project and prepare them for submission to the relevant authorities. Our highly efficient internal processes facilitate smooth coordination and cooperation with the public authorities, clearing the way for an early start to your drilling project.

## Drilling site preparation (construction management and supervision)

Once you have selected the location and obtained the necessary approval, RED takes care of the drill site preparation works. An important aspect of drill site development is assessing the infrastructure in place in order to tackle any logistical problems, and monitoring construction of the drill pad on which the rig will be placed.



Drilling site preparation

# Project management and support during the operational phase

RED's drilling engineers and drilling supervisors give you all the benefit of their vast experience during the operational phase of your drilling project. They help maintain high safety standards and advise on decisions at all stages of drilling operations.

# Documentation and invoice verification

We provide you with comprehensive documentation of the progress of your project and audit all the costs incurred. These services will assist you in your cooperation with contractors and service companies, and will provide the groundwork for the optimisation of future projects.



### Seismic data analysis and geological support services

RAG's Vienna headquarters can give you access to advanced, high-performance computers to process your raw seismic data. The images of the subsurface obtained from the data are analysed and interpreted by our experienced geologists and geophysicists, enabling you to identify prospective formations and drilling targets.





## **Project follow-up**

All the data collected during the operational phase is stored and analysed, whether or not the well results in an economically viable discovery. The increasing pool of experience that we accumulate in this way feeds continuous improvement of our exploration and development drilling methods and is an indispensable aid to the planning and implementation of our exploration drilling projects.



#### Well tests

Well tests can be carried out both during the drilling operations and after the well has been completed, to determine whether oil, gas or hot water are present, and if so, what the potential productivity of the formations is. If the well discovers hydrocarbons, the flow and the transient pressure in the hole will provide indications of the quantity of energy in the reservoir and make it possible to forecast the rate at which the well will produce.



## Well completion and related services

When the well has been drilled and initial completion carried out, it is handed over with an official permit for completion as a well. Since the reservoir characteristics are already known, the preliminary well completion of the project planning stage can be revised, detailed specifications prepared and the completion can be installed under the supervision of the production engineers.



## **Drilling and support services**

Your planned well could be drilled by one of the rigs operated by our RED subsidiary. The entire project is supported by the geologists and drilling engineers who were involved in the planning - a well-versed team with a wealth of operational and technical experience.



Preparation of the drill site is the first step towards project execution. All of the subsequent work starts out from the site, and it is home to the wellhead equipment until the time comes to abandon the well. Site construction usually takes four to six weeks.

# Turnkey projects





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### **Drill site searches**

Drill site selection involves mapping the terrain above the potential deposit, pinpointing access to transport and energy supply infrastructure, and determining the distance from residences and environmentally sensitive areas. The decision on where to site the rig, influences the plans for the potential well path.



### **Project planning**

The drilling project is executed by an interdisciplinary team consisting of geologists, and drilling, production and plant engineers. This approach enables us to exploit the full potential of the reservoir, as the drilling engineer's work encompasses the geological conditions and the potential for development of a discovery well.

#### **Official procedures**

No project can go ahead until it has been assessed by a public hearing, held by the relevant authority. We compile all the documentation required to obtain official approval for your project, ensuring that it is complete and technically and legally sound.

### **Drill site preparation and Coordination**

# Excellence

We have the necessary technical and commercial expertise, and capacity to master the growing challenges in our industry. We have the cutting-edge technology to bring in our projects on specification, on budget and on time whilst meeting the strictest international safety and environmental standards.

# Drilling software:

Planning and design of tubing and casing schemes

- StressCheck
- WELLCAT

**Directional path planning** - COMPASS

Hydraulics and torque/drag analysis - WELLPLAN















## **Production software:**

#### Artificial lift system design

#### - PROSPER

- Avocet Well and Surface Modeler
- Rodstar

Strolar

#### **Data analysis and**

#### interpretation

#### - Saphire

- Emeraude



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# Own equipment store and logistics support team

- Drill pipes, heavyweight drill pipes, drill collars, stabilisers etc.
- Pipes, packers, wellhead equipment, completion equipment etc.

## Framework and service contracts with leading service companies

Successful E&P project implementation depends on strong partnerships with contractors, and oil and gas field service companies. Over our long history of drilling operations we have built up excellent working relationships.

#### Modular services and turnkey projects

RED provides a comprehensive range of services. Thanks to our extensive experience, strong in-house support and partnerships with leading service companies we can deliver full-line solutions, starting from project planning all the way through to drilling and production system construction.



#### Credits

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