

# SCHACHTBAU NORDHAUSEN

# Mining



# MINING

The demands on products and services to be supplied by the mining industry are changing in nature and scope at the same rapid pace as social and technological development.

As an example, in the 16th century miners in the mountains called "Erzgebirge", while in search of silver, found a mineral similar to silver ore from which no silver could be won despite all attempts. They named it pitch blinding and threw it on the stockpile. In the middle of the 20th century, this mineral now under the name uraninite, triggered unprecedented mining activities in order to equip nuclear plants and weapons with the uranium found there. Half a century later, as a result of uranium mining the contaminated sites had to be remediated with equally unprecedented efforts. At the beginning of the 21st century, we are now facing the challenge of managing the final disposal of the accumulated radioactive waste.



As technical and political framework conditions have been changing rapidly and constantly, the ones involved in mining must perseveringly counter these developments with innovative technologies. However, the classical range of tasks of miners has hardly changed for centuries. Repositories are exploited by shafts and routes; these underground structures must be maintained during operations and must be secured after use.

Since its founding by Louis Gebhardt in 1898, Schachtbau Nordhausen has always been able to manage the adaptation to the changing market conditions and, at the same time, to preserve the knowledge and skills gathered from over 120 years of experience in mining. Thus the company is in the position to offer its clients the entire spectrum of mining services, which is essential for the creation, maintenance and safekeeping of underground cavities.



# Shaft sinking and new exploration



The creation of an appropriate access to a geological formation is a basic requirement of every mining activity. Taking into consideration all influencing factors, such an access is made by means of sinking a shaft or excavating galleries. There are different ways of breaking rock mass. Hard rock is usually broken out by drilling and blasting, whereas thrust boring technologies are preferred for softer rocks. A wide range of processes and securing methods is available for the indispensable securing of cavities' soffits, temporary as well as permanent, offering the right solution for the situation on hand. Even complicated and often changing geological conditions are safely controlled this way.

A complete range of experts, equipment and methods required for creation and securing of underground mine workings are available to our clients when cooperating with Schachtbau Nordhausen.



# International projects



## Horizontal drift

### Tunnel driving on Donskoy GOK

In Khromtau, in the steppes of Kazakhstan, a unique mining project started in 2012: SCHACHTBAU Kazakhstan LLP, a local subsidiary of SCHACHTBAU NORDHAUSEN GmbH, had to develop underground tunnels at the mine «10th Anniversary of Independence of Kazakhstan» in the north-west of Central Asia.

With a support system which was new for the local market, the works have been realized. The support consists of polymer fiber reinforced shotcrete with steel arches and radial anchors.

Previous, the concept of development works had been adapted to special, extremely difficult rock conditions, the load calculations had been done and the bearing capacity and suitability for use had been confirmed by the specialists of SCHACHTBAU NORDHAUSEN GmbH. First of all, it was necessary to overcome technological challenges in Kazakhstan and to realize adaptations to local conditions.

The tunnel would be built with the classical method of drill and blast but with an adjustment of the support system to the appropriate rock conditions. The shotcrete to be used

is produced on site under our own supervision.

After the breakthrough to the ventilation shaft at 3.8 km from the start point of tunnel in October 2016, the breakthrough between the two haulage crosscuts on the level of -480 meters with impressive accuracy in direction and height was successfully completed at the end of 2019. Considering the facts of technological and infrastructural problems associated with the implementation of such a high-performance underground development in Central Asia, this accuracy deserves attention. Under partly very

difficult rock conditions it was possible to successfully realize more than 6,000 m tunnels at the level -480 m.

In the coming years, a huge amount of tunnels and underground facilities will be built which are infrastructural requirements essential for long-term production. For ore body mining in challenging rock, which is going to begin in 2023, it is necessary to realize more than 2,000 m with numerous junctions and accompanying underground spaces.

# Restoration



For owners and users of underground facilities, the maintenance of their infrastructure to sustain its value and prolong its useful life is just as important as investing in new facilities. It is therefore reasonable to have the mines which are predominantly under supervision of mining laws maintained and repaired by the same experts who had created them. Our employees are accustomed to being confronted with unusual situations and sometimes extremely difficult access conditions at short notice. Securing operations involving shotcrete and anchors, as well as steel and wood support are carried out in a similar way as sealing work in shafts, using different grouting methods. In case the on-site conditions do not allow safe operations, the required safety activities are performed first to provide sufficient lighting, ventilation and mining safety.

In case of restoration work on plants which are essential for production, it is very often of utmost importance to our clients that the ongoing production operations are not at all or not crucially impeded by this work. This is also the rule rather than the exception for the organization of our projects.

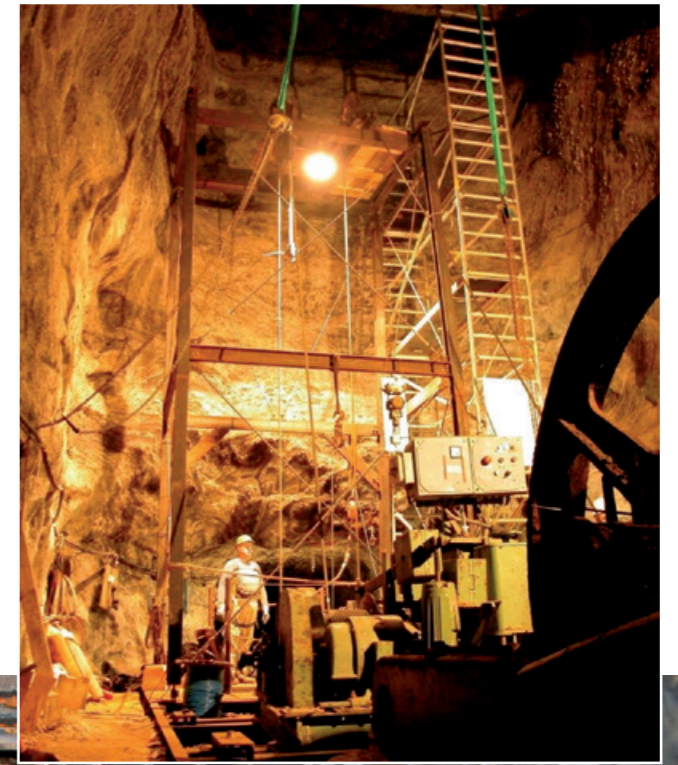


# Safekeeping

If the underground facilities are no longer required, as a rule, they must be kept safe under the supervision of the mining law. Just as with the production, safekeeping of sites usually requires individual solutions, customized for the specific local and geological boundary conditions.

The range of viable possibilities extends from simple filling with loose mass over to highly complex closure structures. The selection of the ideal solution is determined by the objective of safekeeping. The structures to be constructed for tunnel and shaft closures are, if required, performed as multi-unit gas or water tight systems, safe up to 110 bar pressure.

Shallow, abandoned mines, frequently constructed without drawing proper mine maps, are often cause of cave-ins in former mining areas. This can sometimes pose an acute threat to the public safety. Since cave-ins usually cannot be predicted, quick and professional actions have to be taken when they occur. Schachtbau Nordhausen also stands for this.





# SCHACHTBAU NORDHAUSEN



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