



Thyssen Schachtbau GmbH helps relieve water pressure in exploratory drivage

In April 2010 Thyssen Schachtbau showed how quickly it could respond to calls for help by mobilising a 200 bar-rated preventer stack and core drilling machine for the Atdorf exploratory tunnel in the southern Black Forest. After six successful core drillings the water pressure problem in the tunnel was relieved and controlled drainage systems were put in place to reduce the pressure and

material discharge so that the tunnel excavation work could continue.

A new pumped storage power station with a turbine output of up to 1400 megawatts is to be built in the southern Black Forest as a contribution to Germany's future electricity supply security.

This will be one of the biggest construction projects in the Baden-Württemberg region. As part of the reconnaissance programme an exploratory tunnel some 10 m² in section is being excavated using conventional methods.

When preparing shotholes for the tunnel drive the heading team encountered a zone where the joints and fissures were under pressure from sludge infill. It was therefore decided to enlist the help of specialists who had the expertise needed to carry out exploratory drilling work under these conditions. The logical step was to call in THYSSEN SCHACHTBAU GmbH to undertake a preventer-protected exploratory drilling operation that would involve identifying zones of high-pressure water and setting up a controlled drainage system to relieve the pressure. Thyssen Schachtbau responded to the commission immediately by mobilising a Diamec 282 core drilling machine with all accessories and deploying a highly trained team of specialists to the site.



Figure 1: Specialists from Thyssen Schachtbau were quick to bring things under control.

After fitting a standpipe the team was able to install a preventer stack to protect the borehole. As a large hydrostatic water column was expected due to the depth of cover the engineers had calculated on pressure levels being high. The standpipe-to-strata connection was tested at a pressure of up to 120 bar. The preventer stack, which is designed for pressures of as much as 200 bar, was then set in place. The stack comprised: #1 shutoff valve, drilling spool with two side outlets, shear-ram preventer, #2 isolating valve, rotation preventer.



Figure 2: Fitting the preventer system

The exploratory drilling work could then commence under the protection of the preventer system. At drilling depths of about 3 m the team still encountered high-pressure water in some areas, corresponding to the depth of the overburden strata. The preventer stack and its safety devices were therefore a necessary addition and proved to be ideally suited to the job in hand.

Using personnel specially trained for situations of this kind the team was able to drill a number of holes to relieve the pressure and reduce the quantity of discharge from its initially high level. After introducing controlled drainage measures the discharge from one hole dropped off from about 60 l/sec to levels of around 25 l/sec. With Thyssen Schachtbau's help an effective response had been organised and the tunnel drive was able to continue unimpeded.



Figure 3: Drilling inclined holes into the roof posed no problem.

Thyssen Schachtbau has concluded a standby contract with Schluchseewerke AG that commits the company to a quick-response by deploying men and equipment to the exploratory tunnel, should the need arise. This rapid and flexible call-out agreement will help the client avoid unnecessarily long stoppages, which in turn will result in significant cost savings.

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For further information

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