

**DRILLING, WORKOVER
AND LEACHING**



Untergrundspeicher-
und Geotechnologie-
Systeme GmbH

DRILLING, WORKOVER AND LEACHING

Untergrundspeicher- und Geotechnologie-Systeme GmbH (UGS) is a company specialised in underground storage, a technology aimed at the safe, cost-effective and environmentally friendly storage of energy carriers, raw materials and chemical products in deep geological formations. The specific advantage of our highly experienced engineering and service company is that we offer the full range of services, everything necessary to carry out underground storage projects from pre-investigations to the commissioning and operation of turn-key facilities. This includes all geological, engineering, drilling, workover and leaching processes.

The construction, maintenance and operation of underground storage facilities would be unthinkable without the services in the fields of

DRILLING, WORKOVER AND LEACHING

Drilling, workover and leaching crews of proven reliability under the leadership of experienced tool-pushers and supported by competent drilling engineers, measurement teams and maintenance personnel are providing the specific subsurface services required for the construction, maintenance and operation of underground storage facilities.

They can draw on first hand experience and knowledge available in the Geology and Reservoir Engineering Department as well as in the Subsurface Engineering Department. At the same time our engineers learn directly from the experience gathered by the drilling, workover and leaching crews on-site. It is our customers who ultimately benefit from this advantage of ours, which is unique in Germany.

Our priorities are health, safety, high quality standards and environmental protection, as can be seen, among others in our SCC** certification (Safety Certificate for Contractors) as well as in our membership in the IADC (International Association of Drilling Contractors), which are also of direct benefit to our customers.

Our service staff is very familiar with the specific demands of underground storage and our workers can be used in different positions. This makes it possible to use our staff efficiently and flexibly, which is also in our customer's interests.

To fulfil their services to their clients, UGS owns 6 mobile drilling and workover rigs as well as leaching and first-gas-filling plants, measuring vehicles to carry out UGS-specific measurements. Own yards, workshops and personnel are available for storing, maintaining and preparing underground equipment and materials. With this equipment the most important subsurface jobs arising from underground storage can be carried out. Special equipment can be leased when necessary.





**RANGE OF SERVICES OFFERED
BY THE DRILLING, WORKOVER AND
LEACHING DIVISION**

- Drilling of bore holes for underground storage facilities in salt caverns and porous structures designed as vertical, deviated or horizontal wells and equipped with casings of extremely large diameter.
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- Geological exploration wells as well as bore holes for geothermal extraction and balneological purpose
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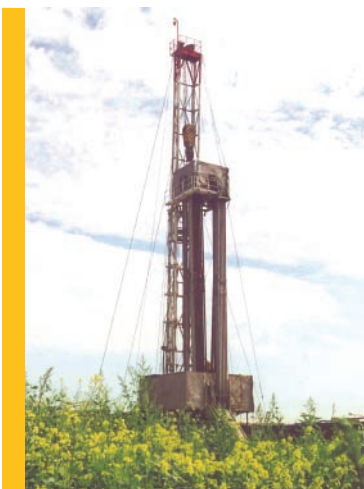
- Completion and re-completion of wells, subsurface repair and maintenance of all types of underground storage facilities.
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- Workover for performing sonar measurements in salt caverns.
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- Bore hole tests and investigations in selected geological formation.
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- Plugging of bore holes in the decommissioning and abandonment process of former storage or hydrocarbons bearing formations
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- Performing of leaching, fresh water production, brine disposal, first-gas-filling and flooding of caverns
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- Performing of specific measuring and testing routines related to underground storage such as
 - In-situ frac test in order to determine the maximum permissible storage pressure in salt caverns
 - Tightness test for checking the technical leak-proofness of the cementation of the final casing string
 - Fluid sampling in bore holes for liquids and gases
 - Determination of the depths of interfaces
 - Monitoring of physical parameters in bore holes (pressure, temperature, flow rate)

SOME OF THE REFERENCES OF THE DRILLING, WORKOVER AND LEACHING DIVISION

Recent references provide clear evidence of the efficiency and flexibility of the Drilling, Workover and Leaching Division:

IRI Franks 900 / T12

Mobile drilling and workover rig with a hook-load capacity of 1,731 kN, preferably used for drilling of large-size cavern wells, for deviated and horizontal wells as well as for drilling deeper bore holes.

1998 Cavern well Kraak 102

1999 Cavern well Huntorf K5 and K6

2000 Cavern well Rüdersdorf K 101

2001 Geothermal well Otterbach/Switzerland (till 2,750 m)

2001 Cavern well Rüdersdorf K 102

IRI Franks 900 / T10

Mobile drilling and workover rig with a hook-load capacity of 1,340 kN, preferably used for drilling of cavern wells, shallow horizontal wells as well as brine disposal wells down to 2,000 m.

1998 Geothermal well Waren 4

1999 Cavern wells Bad Lauchstädt 60, 61, 62, 63

2000 Cavern well Kraak 103

2001 Horizontal well Allmenhausen 51

Mogul 42 / Nr. 104

Mobile drilling and workover rig with a hook-load capacity of 1,110 kN, preferably used for long-term contracted works related to workover for sonar measurements in salt caverns as well as for completing of gas cavern wells.

1998 Sonar measurement at Etzel

1999 Sonar measurement at Nüttermoor

2000 Sonar measurement at Kraak

2001 Sonar measurement at Huntorf

The rigs Franks 200 / T53, Franks 500 /A 52 und P 50 SA / T 51 were mainly used recently for workover, pulling-out of casings and tubings as well as for plugging of abandoned wells.