

PROLOGUE



About Dr Klaus Ziegler:

With UGS GmbH since 1974

Major fields of activity:

Research and development of processes
and technologies in the field of
underground storage

Revamping of storage facilities

Project manager of several important
underground storage projects

Technical Managing Director of UGS
GmbH since July 2000

Combining experience and innovation to shape the future

At present major changes are taking place in how energy is made available and used.

The liberalisation of the energy market has created new market conditions and has made borders between countries less important. This, in turn, has significantly changed the function and importance of energy distribution and storage systems. Energy is being used more efficiently and with more awareness of the environment.

It is firmly believed that under these new market conditions underground storage facilities will continue to play an important role as being one of the best adapted solutions to manage the supply of energy.

At the same time the demand for injection and withdrawal efficiency as well as for operating flexibility is growing. The number of underground storage facilities that have been operated for 20 years and longer is also growing; and it has become necessary to guarantee their continued operation and upgraded performance by a modernisation geared to future needs.

Besides this, new sources of energy are coming up which will also have to be stored on a large scale.

We are prepared to meet the challenges of the present and of the future with new ideas combined with decades of experience in exploring, designing, constructing and operating underground storage facilities.

We create partnerships with our customers, reacting sensitively to their ideas and using our knowledge of the geological and technical possibilities to

develop optimum solutions; and as a member of the worldwide acting Géostock group UGS can dispose of excellent international experience on a large scale.

Reliability, transparency quality and high economic efficiency as well as meeting safety, health and environment requirements are given the highest priority in carrying out projects. This is documented in our certification according to the standards DIN EN ISO 9001 and SCC (Safety Certificate for Contractors).

We believe that co-operation must be for the benefit of all concerned.

We are well aware that UGS can only be successful insofar as our customers are satisfied with the work we have accomplished.

Yours,
Dr. Klaus Ziegler

UGS GMBH – A SUCCESS STORY



For about 40 years UGS's motivated teams have found economically sound, future-oriented, individual solutions for each customer based on real know-how. The trust placed in us by our customers and the partnership we develop with them has made us leaders in the market.

Underground storage technology has been the special area of expertise of our engineering and service company for decades. Already in the 60s of the last century UGS began exploration for petroleum and natural gas. In the 70s geological investigation and the design, construction and operation of underground storage facilities were added to our scope of services and developed to our main field of expertise. We also were and continue to be successful in related fields such as geothermal energy, petroleum and natural gas production and geohydrology as well as gas equipment construction. UGS is a reliable partner for this range of services all the way from the first exploration phases of a project to the delivery of turn-key-facilities. On request we can also act as general contractor.

Innovative and Flexible

Our abilities are due to decades of experience, well-grounded know-how and innovative solutions in all our fields of work. One of our main characteristics is the close link between our engineering and our service activity in the field. UGS operates 6 drilling and workover rigs as well as leaching and first-gas-filling stations. This close connection offers our customers many advantages.

Our competence, flexibility and efficiency have won over many customers to UGS in the private and public sectors in Germany and abroad.

Innovation through Cooperation
Together with well-known research institutes and engineering companies, our specialists are developing new

solutions and are extending the applications we can offer in underground storage technology.

The reputation we have long enjoyed as a market leader in underground storage technology is also based on a staff of 200 motivated workers that has contributed to our many years of economic success. To this staff may be added the Géostock workforce who can team up with the UGS specialists.



COMPETENCE AND KNOW-HOW



We combine reliable and wellproven solutions with innovative approaches

UGS have concentrated their efforts on the following underground storage technologies:

- Re-use of depleted hydrocarbon deposits
- Use of aquifer structures
- Creation of caverns by leaching salt deposits including the disposal of the resulting brine.

UGS can also undertake projects in the field of mined hardrock caverns by calling on the support of their mother company Géostock.

Project Transparency

Our customers can take advantage of the flat hierarchy and openness of the UGS project teams. A fast exchange of information between different departments at every stage of development means that our customers can easily follow and understand the work process. Projects abroad are carried out by a team with international experience.

Tailor-made Solutions

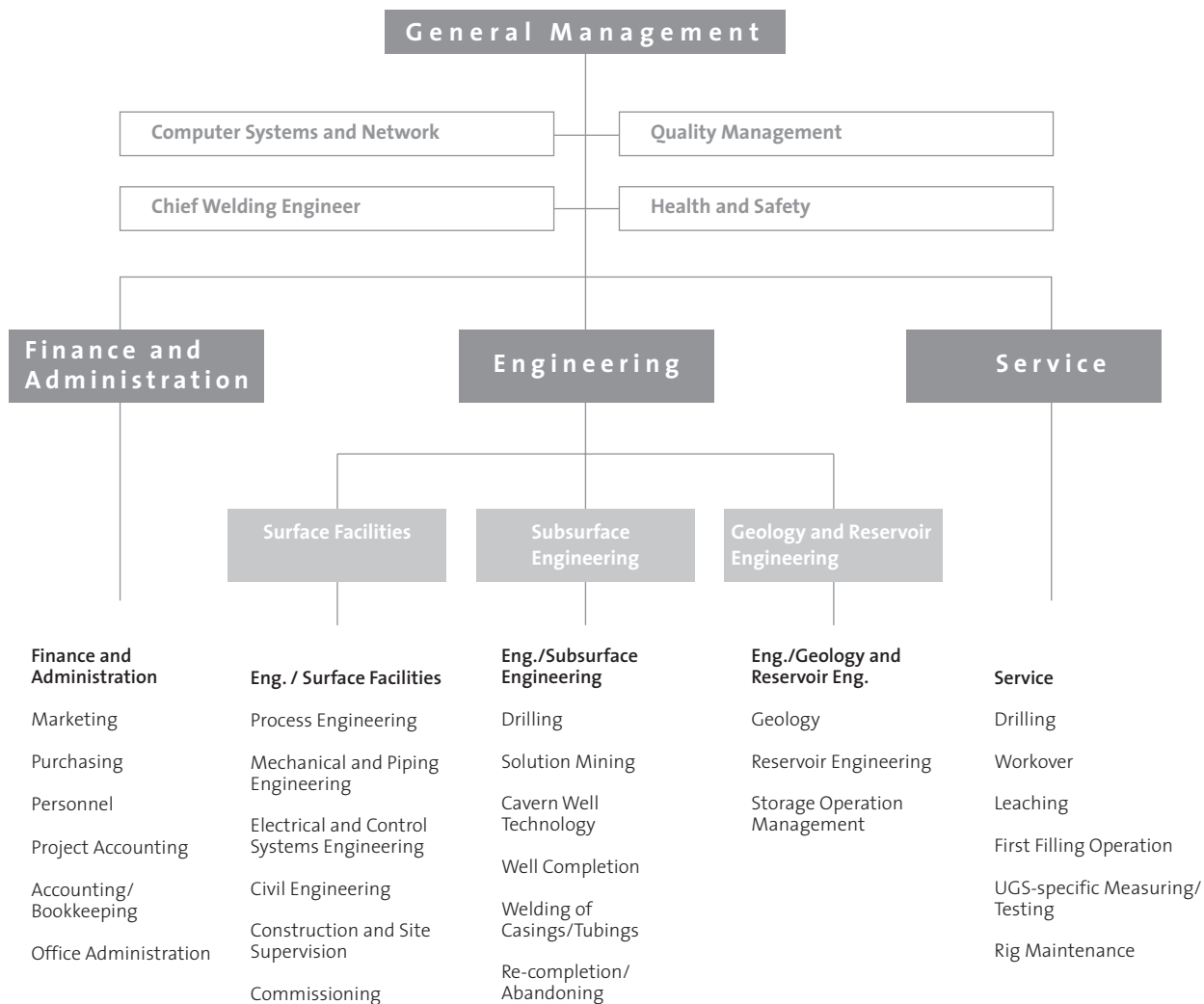
UGS has developed unique technologies and specialised know-how. We are open to innovation and develop continuously new and more effective technologies without rejecting proven and reliable methods.

As a rule we work together with our customers to find tailor-made and efficient solutions both technical and economical. A further advantage we can offer is that we are able to purchase equipment and supplies at good financial conditions.

Underground storage is the safe, economic, environmentally friendly way of storing large volumes of hydrocarbons under liquid, liquefied or gaseous form in natural pores or man made cavities hosted in geological formations deep below ground surface level. This storage technique may also apply for chemical products, feedstock, waste etc...



ORGANISATION OF UGS GMBH



Gesellschafter mit Stand Oktober 2001



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 Géostock (60 %)
 Sedgwick Building 7, rue E. et A. Peugeot
 92563 Rueil Malmaison Cedex - France
 Tel.: 33 (0) 1 47 08 73 00
 Fax: 33 (0) 1 47 08 73 73
 www.geostock.fr



Verbundnetz Gas AG
 VNG - Verbundnetz Gas AG (40 %)
 Braunstrasse 7
 04347 Leipzig - Germany
 Tel.: 49 (0) 341 443 00
 Fax: 49 (0) 341 443 15 00
 www.vngag.de

SERVICES



Our large range of services guarantees individual and efficient solutions that meet the needs of our customers.

Geology and Reservoir Engineering

Our specialists in the field of geology and reservoir engineering are responsible for the exploration of geological structures, the geological supervision and analysis of drilling and tests and geotechnical studies:

- Geological studies for underground storage, brine disposal, production of ground water and extraction of geothermal energy as well as oil and gas production
- Programs for exploration work and the drilling of wells
- Interpretation of bore hole logging
- Analysis and evaluation of storage formations including numerical simulation
- Programs for hydro- and gasdynamical investigations
- Reservoir monitoring and storage operation management
- Official permits

Subsurface Engineering

Drilling and petroleum engineers as well as underground specialists make the necessary analyses, do feasibility studies and determine which technologies and work programs should be used for subsurface work and supervision:

- Drilling and completion of wells for exploration, underground storage, oil and gas production, leaching and brine disposal
- Workover, plugging and abandonment of bore holes
- Leaching simulation, supervision/analysis of cavern shape measurements, history-match, adaptation of solution mining parameters
- Leaching of caverns, solution mining under gas, first gas filling, flooding of caverns

- Casing inspection
- Welding of casings/tubings

Service

The following work can be performed with our own mobile drilling and workover rigs or with our leaching and first gas filling equipment:

- Drilling of wells
- Workover of wells
- Well completion for underground storage, hydrocarbon deposits and geothermal energy extraction
- Leaching of caverns in salt
- Disposal of brine resulting from the leaching of salt caverns
- UGS-specific measurements and tests

Surface Facilities

A team of more than 50 engineers is in charge of the design, delivery of components and the construction supervision for all above ground equipment related to underground storage facilities and puts them into operation:

- Process engineering
- Civil engineering, building construction and steel construction
- Mechanical and piping engineering
- Electrical and control systems engineering, automation
- Document management



RANGE OF SERVICES



Planning / Design

- Expert advice
- Preinvestigations
- Site selection studies
- Exploration of storage locations, feasibility studies
- Assistance in permit procedures (permissions, approvals, operation procedures)
- Basic design of storage facilities
- Specifications

Commissioning and Start-Up

- Training
- Operational manuals
- Test runs
- Commissioning and Start-up

Operation

- Operating equipment for leaching, brine disposal and first gas filling
- Operating storage facilities
- Process analysis of storage operation
- Storage operation management

From the design stage to maintenance, a team of well-coordinated geologists, engineers, technicians and business administrators makes sure that the projects run smoothly.

Construction

- Tender documents
- Evaluation of tenders
- Drilling/workover
- Leaching and brine disposal
- Testing of wells in porous deposits
- Project management
- Construction management and supervision
- Documentation

Maintenance and Reconstruction

- Safety analysis
- Workover of wells and caverns
- Complex revamping and modernisation

Delivery

- Detailed design of facilities
- Delivery of components such as gas dehydration units, compressor stations and heating plants



SOME OF OUR REFERENCES

Underground Storage Projects

Underground storage of natural gas
Bad Lauchstädt
Exploited natural gas deposit
426 · 10⁶ scm working gas

Underground storage of natural gas
Bad Lauchstädt
16 salt caverns
705 · 10⁶ scm working gas

Underground storage of natural gas
Bernburg
27 salt caverns
826 · 10⁶ scm working gas

Underground storage of ethylene
Teutschenthal
3 salt caverns
27.000 t highly pure ethylene

Underground storage of natural gas
Kraak
3 salt caverns
160 · 10⁶ scm working gas

Underground storage of natural gas
Staßfurt
3 salt caverns
100 · 10⁶ scm working gas

Underground storage of natural gas
Ellenberg/Peckensen
10 salt caverns planned
800 · 10⁶ scm working gas
planned

Underground storage of natural gas
Kirchheilingen
Exploited natural gas deposit
170 · 10⁶ scm working gas

Special Know-How

Horizontal drilling
makes higher productivity possible
even in very thin storage horizons

In-situ frac-test
Optimised determination of the maximum permissible storage pressure in salt caverns

Tightness test
Extremely sensitive online test of the technical tightness of the cementing of the final casings

Solution mining under gas
Allows for the early use of the storage cavern before the leaching process is finished

Deviated wells
Reduces expenditures and space requirement when one well site is used for leaching several storage caverns

3D-Leaching simulation
Modelling of salt cavern leaching even under complicated salt deposit conditions

Welding of casings and tubings
Long term tightness and robustness under conditions of alternating stress as well as favourable clearing conditions are the most important advantages

Plugging technology
Makes a reliable plugging of extended cavern necks possible for testing and repair

Brine disposal in underground porous horizons
Environmentally friendly brine disposal inland with highly developed technologies

Casing inspection
Reliable evaluation of the status of the final cemented casings

Document management
Supports secure and up-to-date document retrieval during storage operation by computer aided technologies

Main Clients

BSL SOW - Buna SOW Leuna
Olefinverbund GmbH

CONTIGAS Deutsche Energie-
Aktiengesellschaft

EEG - Erdgas Erdöl GmbH

EWE Aktiengesellschaft

Ferrostaal Aktiengesellschaft

GeoForschungszentrum
Potsdam

GEOTHERMAL EXPLORERS
LTD./Schweiz

GVT - Gasversorgung Thüringen
GmbH

GVV - Gesellschaft zur
Verwahrung und Verwertung
von stillgelegten
Bergwerksbetrieben mbH
HEIN GAS Hamburger
Gaswerke GmbH

Kali und Salz GmbH

KST - Kavernenspeicher Staßfurt
GmbH

Mobil-Erdgas-Erdöl GmbH

RWE Gas Aktiengesellschaft

Thyssengas GmbH
TPAO - TÜRKIYE PETROLLERI
ANONIM ORTAKLIGI/Türkei

VNG - Verbundnetz Gas
Aktiengesellschaft