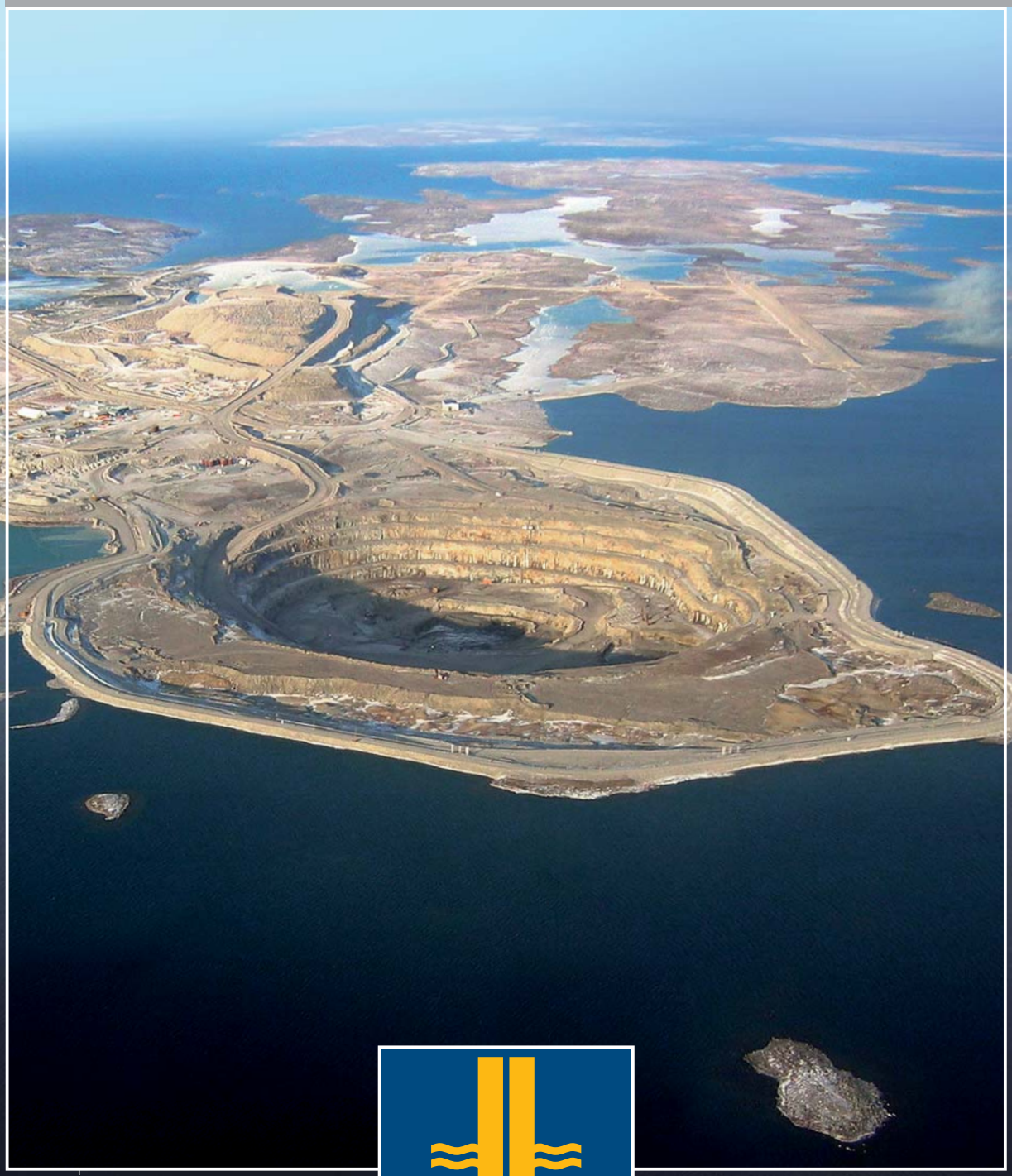
MININGSOLUTIONS

Methods • Equipment • Services



BAUER

PASSION FOR PROGRESS

This slogan reflects the huge innovative strength in developing special foundation construction methods and state-of-the-art equipment for special foundation applications as well as for the resources segment. Our employees' personal drive and motivation is pushing us towards new foundation systems, stronger, faster and environmental friendlier machinery and new technologies for exploration, mining and water.

We jointly build our future on the bedrock of this success. We are proud of our achievements in the past and look forward to our future tasks and challenges with passion and enthusiasm.

Looking back at more than 225 years of history, it is just amazing how adaptable a company has to be and how it can develop so purposeful at the same time. During this time, a craftsman's business has bloomed into a group of companies that employs over 11,000 people in over 110 subsidiaries in more than 70 countries around the world.

"The world is our market" – this is the BAUER Group's motto, which has greatly and permanently shaped the company's activities in recent years.

The BAUER Group is a leading provider of services, equipment and products dealing with ground and groundwater. The operations of the group are divided into three future-oriented segments with a high potential for synergy: **Construction, Equipment and Resources**.

The Construction segment offers new and innovative specialist foundation engineering services alongside the established one's and carries out foundation and excavation work, cut-off walls and ground improvement worldwide. Bauer Maschinen is a world market leader providing a full range of equipment for specialist foundation engineering as well as for exploration, mining and extraction of natural resources. Challenging shaft sinking and related equipment, underground mining and mine closure projects are also in Bauer's portfolio. In the Resources segment, Bauer focuses on highly innovative products and services in the areas of water, environment and natural resources.

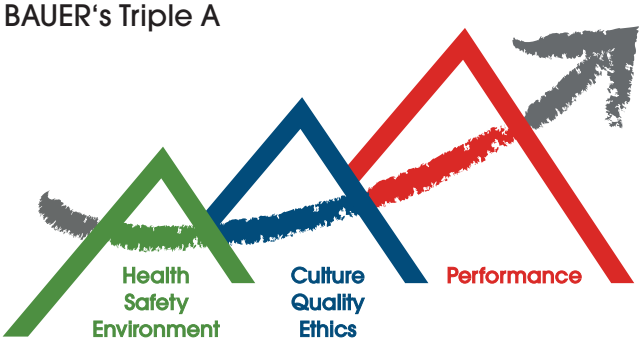
Mine Kleinbodungen, Germany
Shaftsinking for a new potashmine 1912

FalCon Project, Saskatchewan, Canada
Cutter bulk sampling to 250 m depth
Picture in courtesy of Star Diamond Corp.

Ekati Diamond Mine, Northwest Territories, Canada
Orebody trial cutter mining at Misery Pit

All activities of the BAUER Group in mining are based on the experience gained in 120 years of water well drilling, 60 years in special foundation and 50 years in design and manufacturing of specialized equipment. Shaft sinking and underground mining has been our business for more than 120 years. During this very long period of time, methods, technologies and equipment have been developed by Bauer, which became the highest standard in the industry, like water well drilling rigs, piling rigs, trench cutters, foundation and cut-off wall systems. These proven methods and technologies are now modified to Cross-Over Technologies to provide the mining industry with solutions beyond current mining and exploration standards based on our long lasting experience in the special foundation industry.

BAUER's Triple A



The BAUER Group has combined its most important action areas under the maxim "BAUER's Triple A". It is used to reflect the areas of utmost concern within the group of companies.

Safety, occupational health and safety, environmental protection, quality, ethical behavior and good commercial results are considered to be our topmost objectives. Based on our culture we intensively care about the health and safety of our crews on all our construction and mining sites as well as in our worldwide facilities. All our equipment is designed and built to the highest safety standards during rig up, rig down and operation with an additional focus on minimized environmental impact, e.g. reduced noise emissions and energy consumption.

- We are committed to striving for occupational safety, health protection and environmental sustainability in our operations and products with the aim of preventing accidents to the greatest possible extent. Our HSE-system is based on OHSAS 18001 (DIN ISO 45001), ILO and applicable laws and industry standards in related territories.
- We are improving the quality of our products and services through a continuous improvement process, with the aim of avoiding errors to the maximum.
- We always deal with our customers, partners and employees in a trustworthy and responsible manner and adhere to laws and regulations.
- We ensure sustained commercial success of our company through our dedicated work towards minimizing risks.
- We ensure customer, partner and employee satisfaction.

BAUER MINE LIFE CYCLE

Bauer offers solutions and support for all phases of mine life, based on our know-how gained throughout the BAUER Group of companies in all climate conditions from the arctic to the deserts, from the rain forests deep into the oceans.

- Resource definition and exploration, like coring and bulk-sampling
- Project evaluation, consulting and design, like design support or alternative designs
- Mine construction, like mine dewatering, mine water supply, foundations and cut-off technologies as well as shafts and routes
- Mine production like underground and specialized mining methods
- Mine rehabilitation and closure, like backfilling, tailings stabilization and encapsulation

Bauer offers

- Special mining methods
- Specialized equipment
- Extensive training for operation of our systems by our mining clients and their contractors
- Fully integrated services including know-how, equipment and operation

Bauer provides “more than just a product or a service”. Clients enjoy all-in-one solutions thanks to the company’s in-depth experience.

With our worldwide network of subsidiaries, offices, dealers and partners, we are close to your operation in any part of the world.

EQUIPMENT

- Standard & customized
- Sale & rental

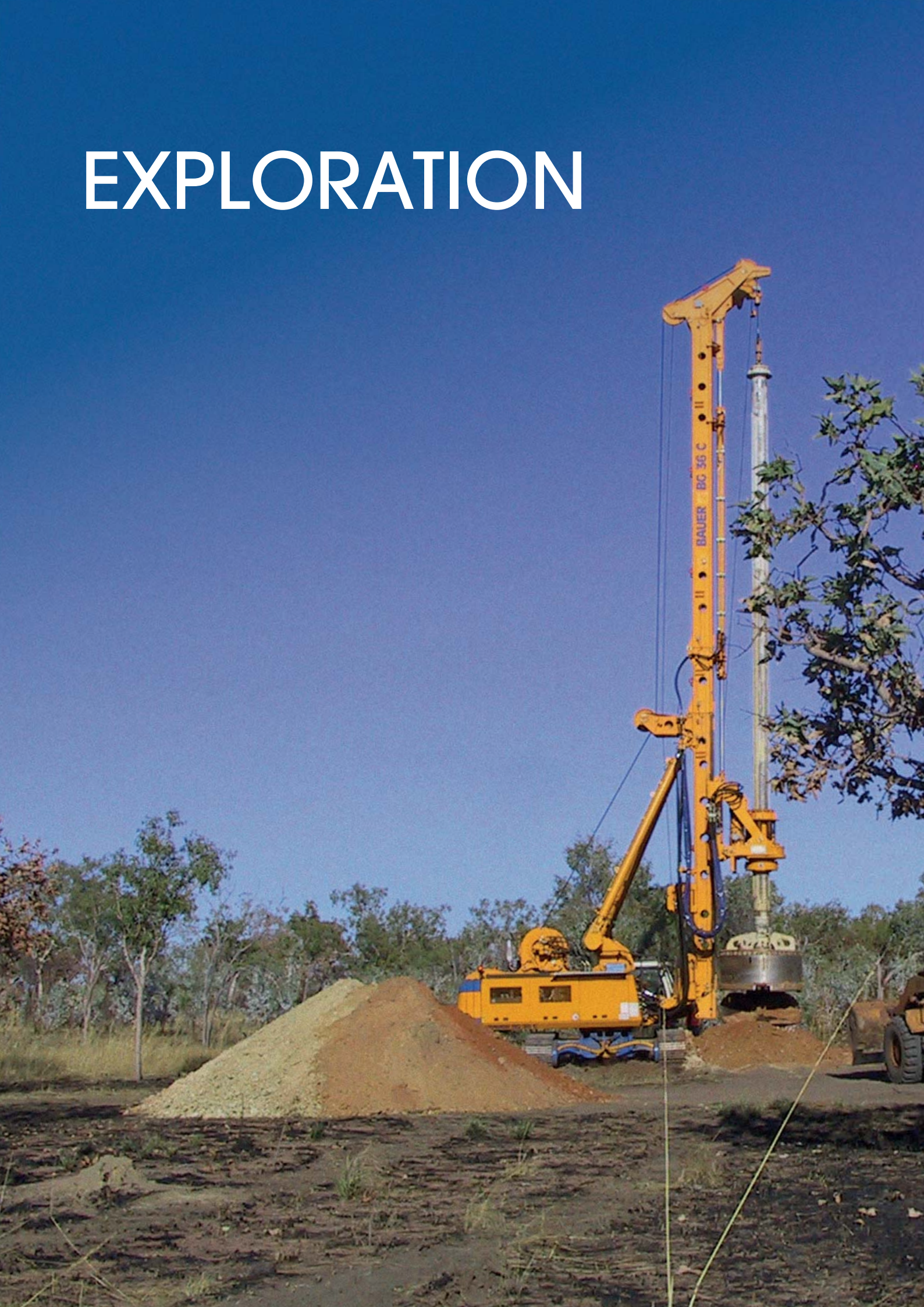
SERVICES

- Within the BAUER Group
- Together with local partners
- Providing operators & support

METHODS

- Standard foundation methods
- Cross-over technology
- Advanced drilling technology
- Customized mining methods

EXPLORATION



Exploration is essential for ensuring a stable and sustainable supply of mineral commodities in the future. As the first step in the mining cycle, exploration contributes to defining mineral potential areas, the discovery of new deposits or to improve knowledge about existing ones that could become mines in time.

Bauer's expertise lies in all different types of drilling and sampling systems, from 50 mm diameter to 3,000 mm and more, on- and offshore.

When it comes to bulk sampling, our optimized civil engineering technologies provide samples of exceptional good quality and in any quantity required, in all different commodities as specified by the geologists of our clients.

Ellendale, Australia
Kimberlite bulk sampling 2.5 m diameter

CORE SAMPLING
Coring / Wireline Coring

Bauer provides integrated technology and services for different coring systems, including drill string, rotary head and drill rig, to a depth of 3,000 m and more. To accurately investigate rock sequences – for which the recovery of good quality drill cores is essential – rotary wireline core drilling with a double tube core barrel is state of the art technology.

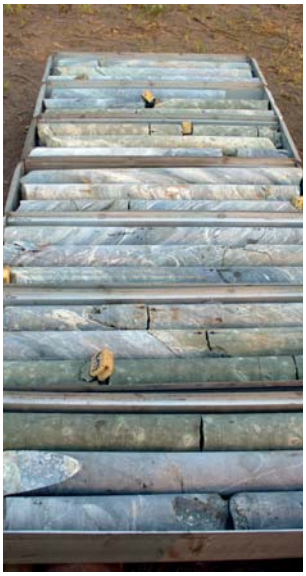
Each of our standard RB / RBT drill rigs with pullback capacities of up to 135 tons can be customized to the needs of the client and its projects.

BULK SAMPLING
Reverse Circulation System

During the advanced exploration phase, drilling programs are intensified to further enhance knowledge about the resource. Bulk samples provide more details about the grade of the potential orebody. Bauer supplies reverse circulation airlift systems starting from a diameter of 100 mm to about 1,500 mm. Depending on the drill rig used, drilling depths of 1,000 m and more can be reached.

Jwaneng Diamond Mine, Botswana
5 ½“ wireline core drilling

Shore Gold Inc., Saskatchewan, Canada
Kimberlite bulk sampling, dia.1.2 m with RC system on BG up to 360 m depth



Lucapa, Angola
4“ Large diameter Kimberlite coring for DeBeers

Jwaneng Diamond Mine, Botswana
Recovery of 5 ½“ core

Liqhobong Kimberlite Mine, Lesotho
17 ½” RC bulk sampling

Rotary Drill Rig BG System

Bauer's huge experience in large diameter drilling of up to 3 m diameter and to a depth of 150 m with our BG piling rigs is widely used to bulk sample very effectively various commodities through different ground conditions. The possibility to adjust the drilling tools very fast to changing soil and rock conditions over depth, made the Bauer BG rigs the preferred bulk sampling tool in coal, iron ore, kimberlite, alluvial diamonds and various other resources.

Cutter BC System

For greater depth to 250 m, the Bauer cutter system generates very high volumes of bulk samples from about 5 to 15 tons per meter depth, in up to 100 MPa UCS soils and rocks. In rock formation, cutting and sample transport can be achieved by use of water only as transport medium, in soft ore bodies and overburden material standard bentonite slurry, as used in the foundation industry, prevents the trench from collapsing.

DeBeers Kleinzee Mine, South Africa
Sampling of alluvial diamonds up to 100 m depth with BG 48, dia. 2.5 m

FalCon Project, Saskatchewan, Canada
Cutter bulk sampling to 250 m depth

Kareevlei Wes, South Africa
Kimberlite / Lamporite bulk sampling, BG 36, dia. 2.5 m

FalCon Project, Saskatchewan, Canada
Kimberlite recovery and bagging station

BULK SAMPLING

Mine Dumps

With ore processing technologies improving year by year, old mine dumps can again provide a significant contribution to the revenues of an existing mine or being a stand-alone operation. With our BG rigs old mine dumps are sampled to determine the grade and distribution of the ore left behind in the dumps by former mining activities, allowing to concentrate re-mining on the economically attractive portions of older dumps.

Grade Control

The ore grade and the mineral being mined is rarely constant in the ore body. Therefore, grade control is an essential part of mining to ensure the economic viability of the mining operation and to supply an optimized ore blend to the process plant to increase the efficiency and to provide ore with a constant quality to the market.

Jagersfontain Mine, South Africa
Kimberlite mine dump sampling 2.5 m diameter

Vale coal mine, Mozambique
Coal grade control, diameter 1.5 m to 80 m depth with BG system

Nickel mine dump, Botswana

Iron ore grade control, Ghana

OFFSHORE

Seabed Coring

Exploration for offshore seabed commodities like SMS (seafloor massive sulfides) and others, scientific research as well as foundation works for offshore structures like wind parks, require coring and borehole logging to gain detailed knowledge of the seabed geological structures.

Bauer's MeBo is a specialized seafloor core drilling system, working in water depths up to 4,000 m. It is deployed on the seabed, electrically powered and remotely controlled from the vessel via umbilical. Four foldable legs provide safe landing and verticality on the seafloor. The MeBo stores drill rods, casing tubes and rotary barrels on two rotating magazines.

Offshore exploration, New Zealand

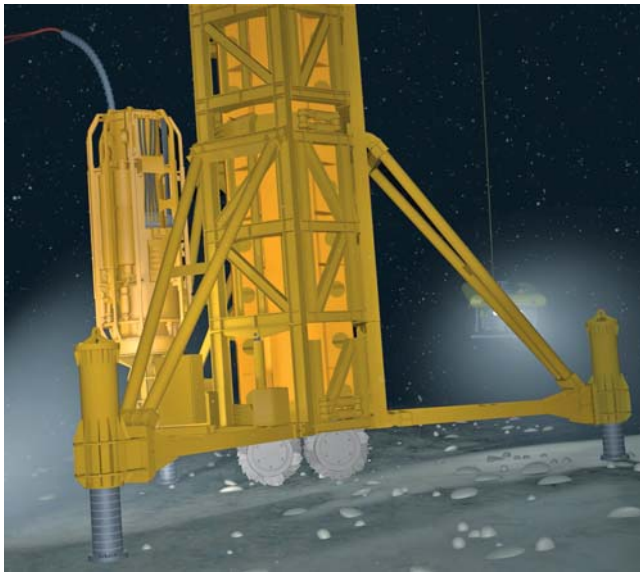
Depending on the drilling system and coring diameter, the MeBo has a capacity to drill up to 200 m into the seafloor and to recover cores of 54 to 101 mm diameter. Multiple cores can be stored in the rod magazine to the total maximum capacity. The preferred sampling methods are push coring (soft sediments) and rotary drilling (wire line coring) for rock and sediments. Other borehole logging methods like CPT are optional. MeBo was originally developed in cooperation with the Marum Centre for Marine Environmental Sciences.

Seafloor Bulk Sampling

Bauer Maschinen offers seafloor bulk sampling systems, based on our trench cutter technology for water depths up to 2,500 m, sampling different kind of commodities from soft alluvial to hard SMS (seafloor massive sulfides). For shallow water applications, the sample is directly pumped to the support vessel. For great water depth deposits, the cutter sample is taken directly into a container on the seafloor and lifted to the support vessel by a winch system.

Key components of the Deep Sea Mining System are the adjustable landing frame with cutter, the transfer container to bring the ore up to the support vessel and the underwater electric-hydraulic power pack. The umbilical system and operation center are installed onboard the vessel.

BHP Offshore, Namibia
Alluvial diamond deposit exploration with a BC cutter in water depth of 160 m



Deep sea mining system
Mining tool with landing frame on seafloor

MINE DEVELOPMENT & INFRASTRUCTURE

The process of constructing a mining facility and the infrastructure to support the facility is known as mine development.

Mine development involves many activities such as:

- The preparation of the mine site by clearing trees and overburden removal
- Construction of infrastructure to get access to the mine and in the mine, power lines, substations or water lines
- The construction of mining facilities such as shafts, head frames, processing plants, waste and tailings ponds, water dikes, camp facilities, administration buildings or mechanical shops

With its extensive know-how Bauer contributes to the design and installation of a mine and its infrastructure. In terms of slope stability, mine water supply and dewatering, shafts and various cut-off systems for water dikes and tailings dams our expertise supports the customer's efforts for a costeffective mine development.

Diavik Diamond Mine, Northwest Territories, Canada
Dike construction A154 & A418 for open pit mining

WATER MANAGEMENT
Cut-off Systems

Cut-off walls are ideally suited as barriers along or around open mining pits or tailings ponds to prevent water seepage into the mine or out of tailings ponds. A variety of cut-off systems is available for almost each type of underground and site condition, for temporary or for permanent use. Cut-off systems are constructed with proven techniques of the specialist foundation industry.

In soft formations and for shallow cut-off walls with low to medium high hydraulic gradients soil bentonite walls or cement bentonite walls are very effective. To minimize or even prevent disposal of excavated material during cut-off wall construction and to minimize the amount of self-hardening slurry used, active soil mixing systems are nowadays state-of-the-art technology (one phase cut-off systems).

Diavik Diamond Mine, Northwest Territories, Canada
Installation of a cutter soil mixing wall

Namdeb Mine, Pocket Beaches, Namibia
Cement bentonite cut-off wall along the Atlantic Ocean for alluvial open pit mining

Diavik Diamond Mine, Northwest Territories, Canada
Creation of a 26 m deep cut-off wall for the 2.2 km A21 dike

For deep cut-off walls especially in difficult underground conditions, a two phase cut-off system is always the method of choice, using a bentonite slurry during excavation and replacing it with a special mix plastic concrete once the panel has reached final depth. Excavation by a combination of grab and cutter guarantees successful and timely excavation.

The grouting technology is either used as a stand-alone method or in combination with other cut-off systems to improve the tightness of in situ ground conditions using small diameter borings. The improvement can be achieved by filling cavities, fissures or pores, or by creating and subsequently filling fractures using cement-based or chemical-based fluids.

Vattenfall lignite mine, Germany
Installation of a 150 m deep clay core cut-off wall with a customized electrically driven cutter system

Diavik Diamond Mine, Northwest Territories, Canada
Curtain grouting and jet grouting on dike A21

Rosshaupten Dam, Germany
Cut-off wall installation with cutter and grab

WATER MANAGEMENT

Water Wells – Dewatering & Supply

Water wells are standard for active groundwater control. Wells are constructed around and inside open pits or underground mines to allow for dry mining. In combination with cut-off walls, deep wells are installed inside the pit for dewatering and to keep the water table below mining level at all time.

In all mines constant water supply is required in the ore processing facilities as well as for camp facilities.

The BAUER Group can provide everything required for water well installation – from the supply of specialized drilling equipment including drilling services to the supply of all necessary well engineering materials by GWE company to assure for a long lasting well performance.

Gold mine, Ghana
Dewatering wells for open pit operations

Newmont Gold Mine, Ghana
120 m long horizontal depressurization wells

Grand Cote, Diogo, Senegal
Installation of 550 m deep mine water supply wells

Copper mine, DRC
Installation of 16“ GWE screens

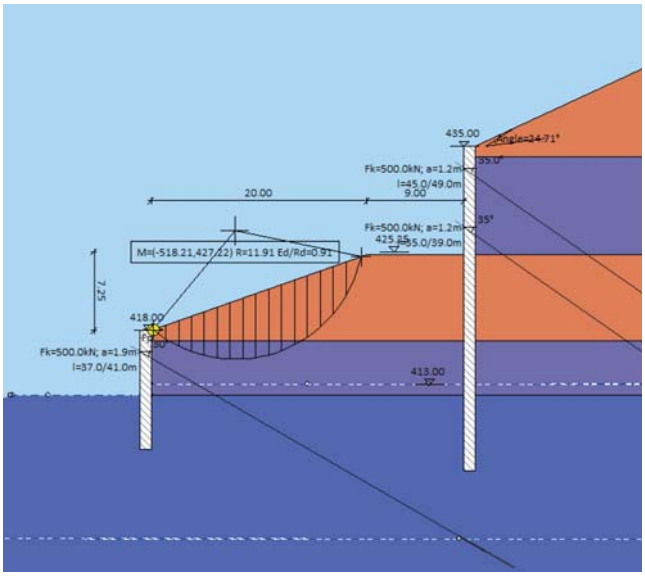
OPTIMIZATION OF PIT DESIGN

Ground Improvement & Slope Stabilization

The variety of civil engineering methods available in Bauer together with our expertise is an ideal combination for optimizing the design of an open pit mine. Besides significant reductions in cost, a minimized environmental foot print by reduced land use or dewatering will increase the regulatory and also social acceptance for new mines.

Our ground improvement systems offer suitable solutions to provide adequate margins of safety against geotechnical and bearing failure and also to mitigate liquefaction risks.

Open pit coal mine, Indonesia
Contiguous bored pile wall for ground water control and reduced foot print



Concept design open pit mine, Canada
Stability analysis for proposed slope with special foundation works

Open pit coal mine, Indonesia
Detailed view of contiguous pile wall with layers of grouted anchors

DIKES AND TAILINGS DAMS

Stabilization & Rehabilitation

Tailings dams contain fine rock particles, unrecoverable and uneconomic metals, minerals, chemicals, organics and process water of a mining process plant in form of soft paste or fluids. In most cases, these tailings management facilities (TMF) remain in place, even for long time after the mine has been closed.

Due to increased safety requirements, long lasting dam stability and impermeability of the tailings dam or the underground of the TMF are the main focus during design and construction of new structures, but also for the rehabilitation of older dams and the overall TMF life cycle including mine closure. Tailings solidification can be a method of immobilization of chemicals in the tailings, stabilizing a weak dam structure and prevent leakage through the dam or through the underground beneath the dam. Additionally, on soft grounds in seismic areas, earthquake resistance of the base and structure of dams often requires improvement to prevent potential catastrophic failure.

External risks to dams imposed by
- Overtopping and thus surface erosion
- Increased environmental and mine water regulations
- Increase of pond volume by raising the dam and thus increased hydrogeological conditions for dam and foundation

Internal risks to dams imposed by
- Uncontrolled seepage through the dike body
- Uncontrolled seepage through the foundation of the dike
- Risk of dike stability by seismic events which may cause liquefaction
- Risk of foundation stability by seismic events which may cause liquefaction
- Uncontrolled and untreated seepage water
- Overtopping by flood water with rapid increase of pore pressure and risk of static liquefaction

Potash production, Jordan
Dike remediation works with 4.2 km long cut-off wall

Vancouver, Canada
Soil stabilization with soil mixing web-structure

Teller Dam, Colorado, USA
Remediation works to intercept seepage and erosion

Diavik Diamond Mine, Canada
Vibro densification of man-made dike

Monitoring

Bauer offers a comprehensive service package for increased safety of dikes and dams and minimized risks for downstream residents during construction and operation. It covers planning, analysis and reporting followed by prognosis and alarm system with proposed enhancement and prevention plan, providing the information to stakeholder and public via cloud-accessible dashboards.

- Identification of the main risks
- Design of a monitoring plan and system
- Delivery of the project-specific monitoring package
- Installation, monitoring and servicing of instrumentation

Potash production, Jordan
Installation of dike monitoring device

- Analysis and provision of measurement data in a web-based format on desktop PC, mobile phone or tablet
- Prognosis of the safety conditions of the wall behavior
- Provision of a warning system and action plan
- Reduced remediation cost due to early detection of damage progression

For real time monitoring, tailored software solutions integrate and combine soil investigation data, monitoring, model results and interpretations, so that geotechnical risks can be identified more rapidly. The software includes an interactive data platform providing a single point of truth for designers, construction teams, geotechnicians and decision makers. It supports teams to manage risks in complex construction projects.

The software portal is ideally accessible via an online working environment and yields real-time insight into geohydrological processes, the effects of construction and operation activities and deformations. The objective presentation of measurement results is a major source of confidence for stakeholders and enables informed decision-making.

Gold mine, Ghana
Drilling of monitoring holes on tailings dam

Monitoring visualization
Visualization with project-specific dashboards

SHAFTS
Access Shafts

Creation of an appropriate access to a geological formation is the basic prerequisite of every underground mining activity. Bauer provides a complete range of experts, methods and equipment to construct and secure vertical shafts. Thanks to the company's in-depth experience and portfolio, even complicated and variable geological conditions are safely managed. With Schachtbau Nordhausen's experience, the BAUER Group can rely on more than 120 years of successful underground mining and shaft construction.

For larger diameter shafts of almost any diameter Bauer`s expertise lies especially in the construction of shafts in unconsolidated, water-bearing upper formations, where standard hard rock shaft sinking methods experience difficulties.

For the installation of shafts special foundation technologies such as freeze-hole drilling, pile walls or diaphragm walls to depths of 150 m or more are available. Decisive advantages of these methods are that no additional liners are required and that they allow excavation in dry.

Woodsmith Mine, United Kingdom
Construction of circular diaphragm wall shafts up to 35 m diameter

Shaft Lohra
Tubbing shaft

Rothschönberger Mine, Germany
Getting in trim of light hole

Frankfurt, Germany
Construction of vertical shaft with secant pile wall

EQUIPMENT FOR VERTICAL SHAFTS

Our service portfolio for mining shafts includes delivery and assembly of the following essential equipment:

- Planning, construction, operation and maintenance of rope, access and auxiliary or emergency installations.
- Design and installation of shaft downspout (e.g. API, ZSM).
- Auxiliary cages and barrels
- Hoisting cages and vessels
- Shaft internals (e.g. guide rails)
- Working platforms (fixed or mobile)
- Shaft covers

Based on the experience of shaft operations, a series of mining hoists have been designed and built for vertical and inclined mine shafts. Its main purpose is the operation during construction on mine sites, providing access for personnel and supply of material to underground workings.

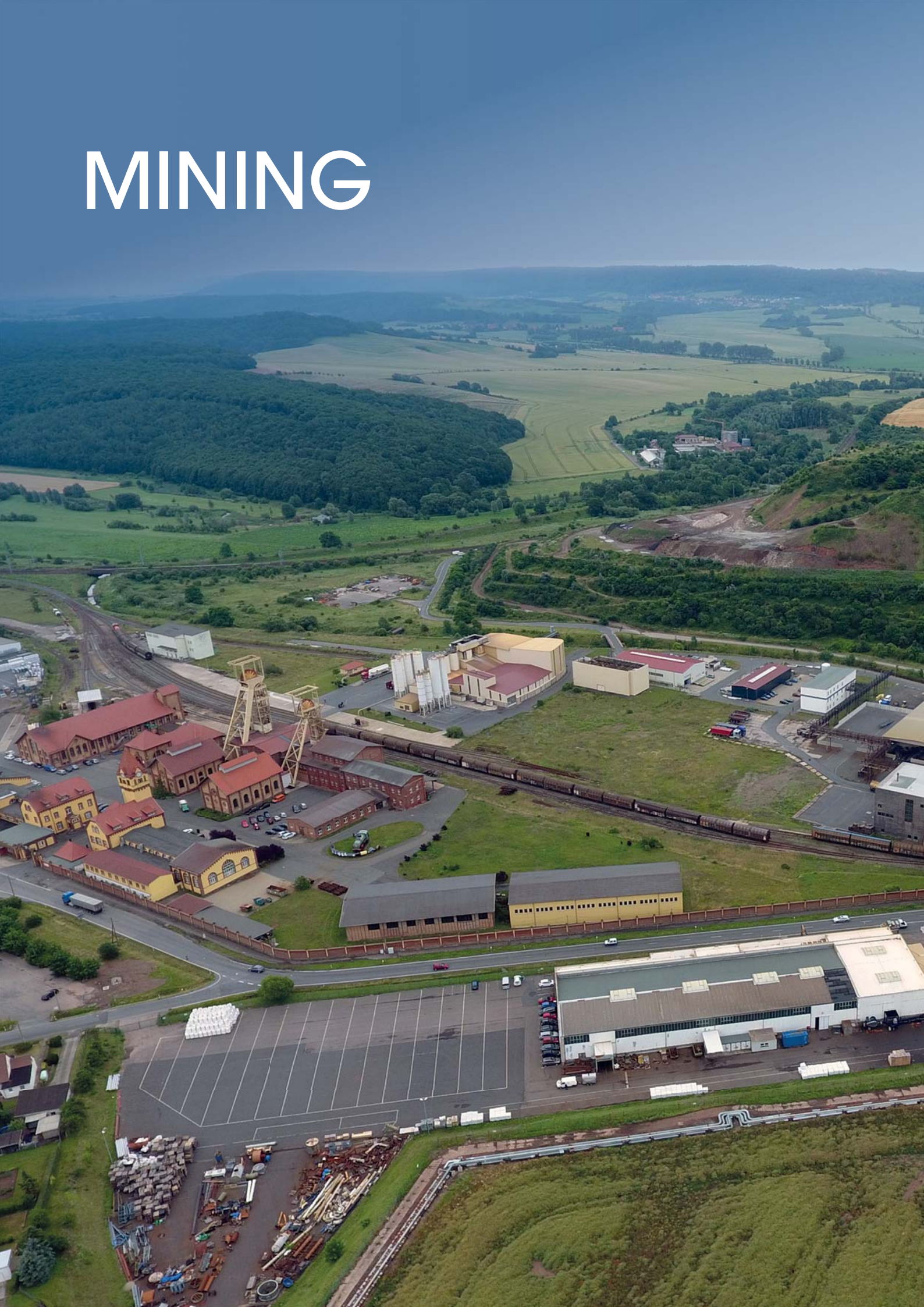
Shaft Sondershausen, Germany
Manufacturing and installation of new head frame

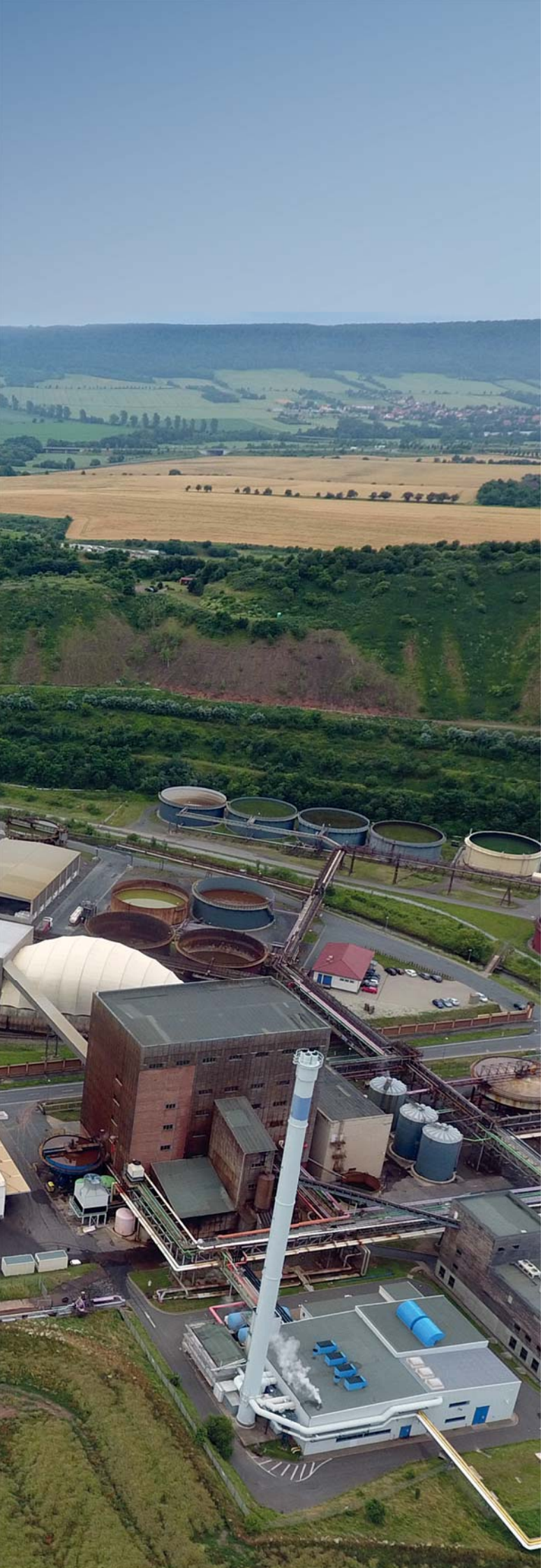
Shaft Sondershausen, Germany
Working platform with 6 floors

Compact situation hoist system
with a working platform

Mining hoist
Compact mining hoist for working service and rescue

MINING



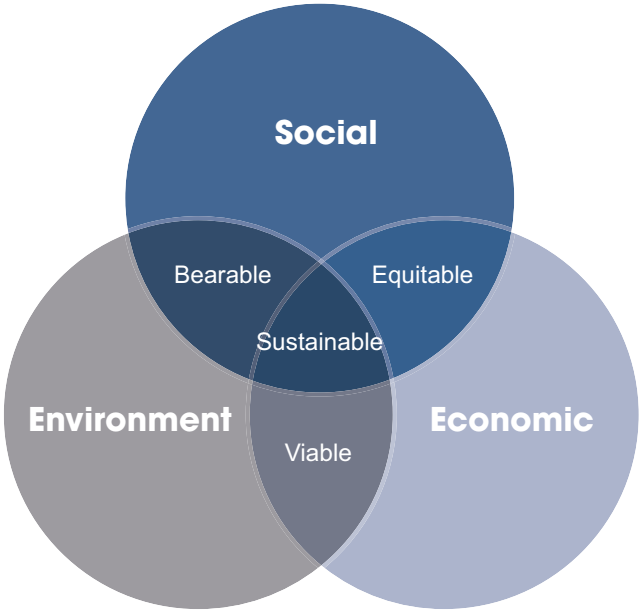


Beside Bauer's and especially Schachtbau Nordhausen's contribution to **conventional underground mining,**

Bauer is also focusing on **alternative mining technologies**,

aiming for:

- Turning small ore bodies into economic mining
- Mining of remnants of an ore body to extend mine life
- Minimizing "time to mine"
- Minimizing dilution of ore
- Mechanized, hands-free mining systems
- Minimizing the environmental foot print



The three pillars of sustainability

Mine Bleicherode, Germany
Solution potash mining by DEUSA International GmbH, waste disposal and heap reclamation by NDH Entsorgungsbetreibergesellschaft

ALTERNATIVE MINING METHODS
Leaching & Hydraulic Mining

In situ leaching is also known as solution mining or in situ recovery and common for copper or uranium mining. Holes are drilled down to the ore body, leaching solution is pumped into the ore body and dissolved ore is then recovered through neighboring production wells and processed. Therefore, there is only little surface disturbance and nearly no waste material. However, the basic requirement for the system is the permeability of the orebody. As a further in situ mining method with direct attack to the orebody and only limited surface disturbance, Bauer's hydraulic mining systems use water jets of up to 1,000 bar operating pressure to create caverns and mine underground deposits. For this purpose, a small diameter hole is first drilled to the ore body. Then the desired material / ore is cut out by the water jet and delivered to the surface. To extend the reach of the water jet and thus the mining radius of the mined out ore, the jet nozzles can be installed on foldable arms.

For transport of larger particles to surface and higher production rates, reverse circulation airlift system is used in combination with high pressure water jet for the High Pressure Reverse Circulation mining system (HPRC). In combination with a specially designed top drive, the mining pipes can be equipped with individual process lines for high pressure jet water, high pressure water for a mud motor, compressed air for the air shroud of the jet nozzles, compressed air for the air lift and separate lines for monitoring system, to customize the system to different orebodies.

Kaolin mine, Germany
High pressure jet mining with foldable nozzle arms

Kaolin mine, Germany
Stripped water jet cavern

Uranium mine, Kazakhstan
Installation of production wells for insitu leaching

Uranium mining, Canada
HPRC system mounted on RB-T 100 base machine

Uranium mining, Canada
HPRC mining pipe section with process lines

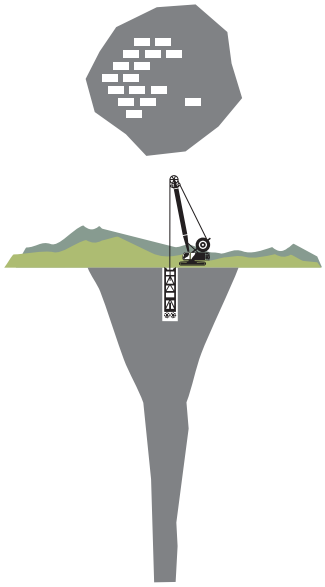
Vertical Cutter Mining

Near vertical metallurgical coal seams, gold veins or kimberlite dikes are examples for ore bodies which require very high stripping ratios to mine in open pit technology. Quite often this makes it uneconomical and valuable high-grade ore is left behind untouched. Bauer's cutter technology, proven on thousands of sites all over the world in all different soils and rocks, is the most suitable tool to mine these deposits economically from surface with a very small environmental foot print compared to conventional mining.

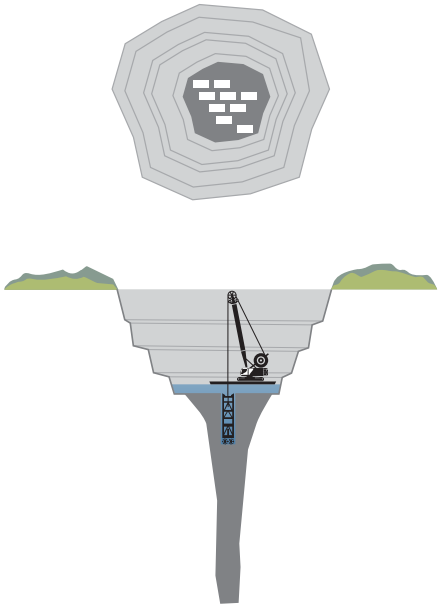
Also small ore bodies, or remnants of ore left behind at the end of open pit mine life or even underground, can be mined with cutter or large diameter drilling technology. Options are developed for the mining rig, walking on the ore body itself combined with paste back of excavated trenches or being moved on floating barge systems, to maximize the recovery of ore.

For open pit and underground mining, all our systems are now available either diesel driven or alternatively in electric mode.

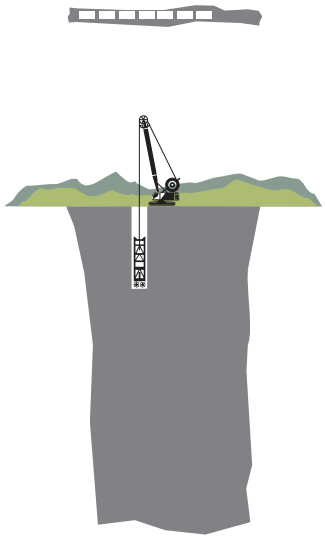
Small Ore Body
Mining from surface level



OP End of Mine
Mining from pit level



Dike / Vein
Vertical or near vertical



Cutter mining from surface level, Canada

Cutter mining from pit level, Canada

Cutter mining of kimberlite veins, Sierra Leone

UNDERGROUND MINING
Horizontal Drifts

Prior to the mining of underground deposits, horizontal or subhorizontal development openings have to be made to gain access to the resources. Whether in salt, ore or in deposits of other mineral raw materials – suitable solutions and the latest technologies can be offered. The specialists and engineers with extensive and long-standing know-how are available especially for tasks in particularly difficult conditions, short implementation times and / or complex technological requirements.

A unique opportunity for customers, even in remote areas of the world, is the capability of our group to provide all partial services - from planning to execution, operation and documentation - from a single source.

Mähringer Berg, Ulm, Germany
Work for a new underground limestone mine

Bleicherode, Germany
Conventional drifting with a selective road header

Kazakhstan
Mining, roadway junction

Bleicherode, Germany
Conventional drifting with drilling and blasting in a heap adit

CBM & Degasification

Methane is embedded in all coal deposits. Depending on the quality and amount of methane, coal seams must be degasified prior to accessing the underground mine. Degasification can be achieved by drilling vertical holes or directional drilling to follow the coal seam over great length to reduce the total amount of drilling.

In smaller coal seams, uneconomic for mining, the same rigs and similar technology is used for just producing coal bed methane (CBM) for power generation.

Ventilation Shafts & Rescue Shafts

Mine ventilation is absolutely mandatory for any underground operation. Bauer provides safe and efficient solutions for ventilation shafts and also rescue access shafts. For drilling smaller diameter shafts up to approximately 1.5 m, our RB-T 100 or RB-T 135 are most suitable to depth of 500 m. Alternatively, BG piling rigs can be used very effectively for shaft installation to about 150 m depth, even in difficult overburden conditions.

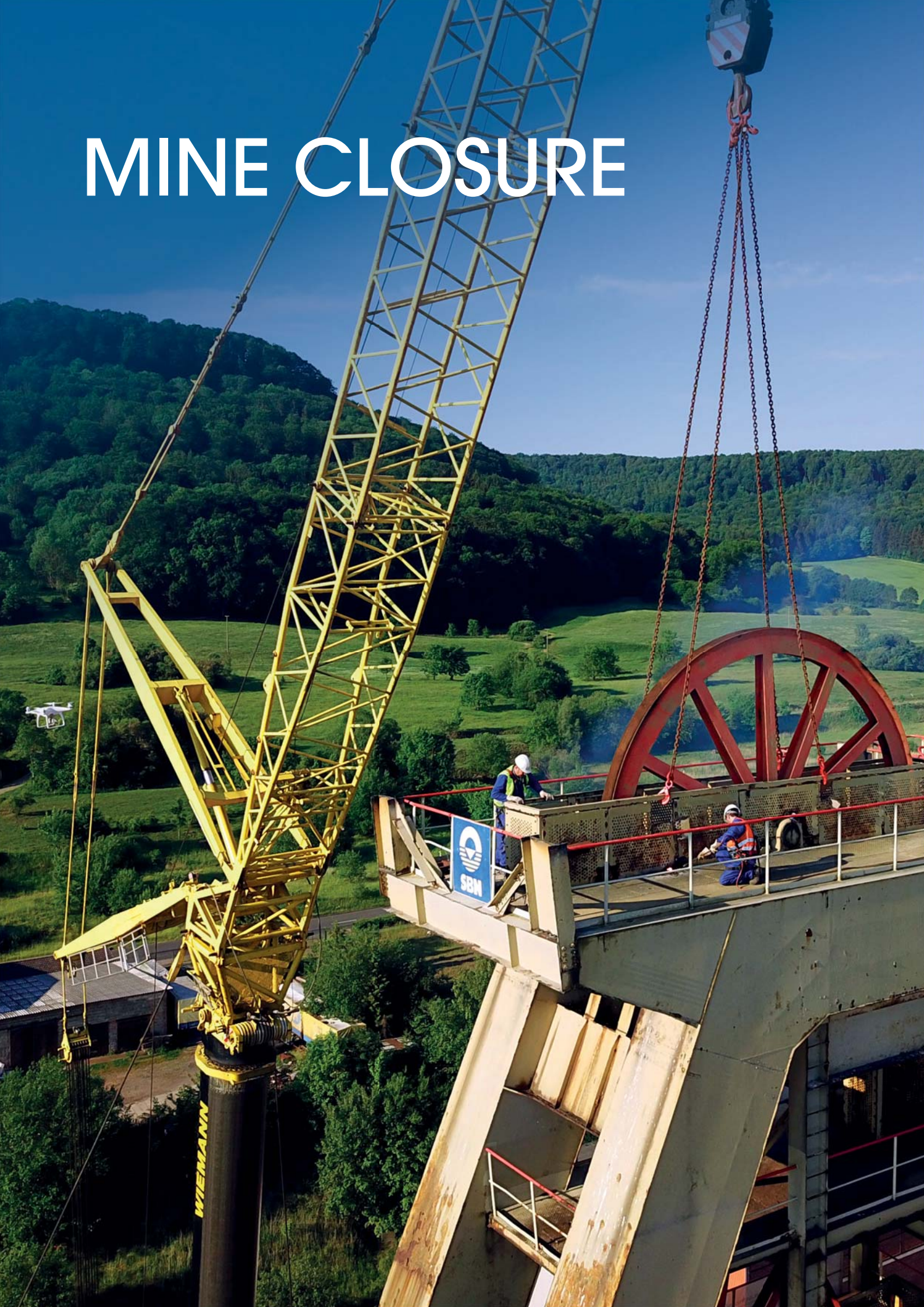
Coal mine, Kuzbass Region, Russia
Degasification of coal layers prior to underground mining

Pyngi Mine, Shandong Province, China
4 miners had been rescued via a 711 mm drilled hole to 226 m, after 36 days being trapped underground

ShanXi, China
Coal bed methane drilling

Coal mine, Kuzbass Region, Russia
Installation of 550 m deep ventilation shafts of up to 1,500 mm diameter

MINE CLOSURE



The final stage in the mining life cycle is the **Mine Closure** - the process for ending the operation of a mine. It is an important environmental and economic task in the mining industry. Recognizing the importance of this process demanding engineering solutions are required.

Key topics of mine closure:

- Protection of public health and safety
- Alleviation or elimination of environmental damage
- Achievement of a productive use of the land or a return to its original condition or an acceptable alternative

Bischofferode Mine, Germany
Industrial dismantling of head frame and cleanup in a potash mine

REMEDIATION & CLEANUP

Various companies and divisions and especially the Resources Segment of the BAUER Group provide a comprehensive range of services, including planning and consulting in all environmental areas. Our expert remediation work covers the treatment of contaminated soil and water, as well as landfill site remediation, industrial dismantling and disposal of mineral wastes.

SAFEKEEPING SHAFTS & ROUTES

Underground facilities which are no longer serving for mining, must be kept safe permanently under the rules of the mining law. It is crucial to avoid contamination of different aquifers or settlements which can reach up to the surface. The range of viable safekeeping possibilities extends from simple filling with loose mass over to highly complex closure structures.

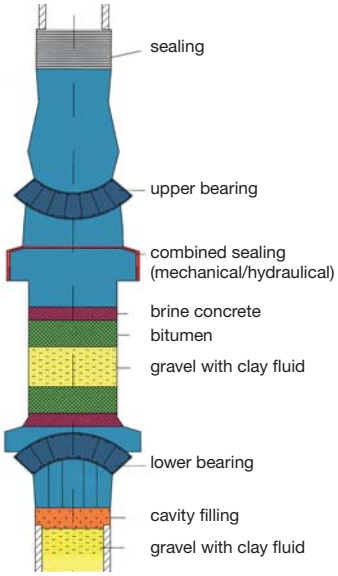
Our experts of Schachtbau Nordhausen will select the ideal solution, determined by the objective of safekeeping and customized for the specific local and geological boundary conditions.

Chemnitz, Germany
Cleanup works at power plant

Morsleben, Germany
Erection of a sealing structure in rock salt

Bischofferode, Germany
Dismantling of head frame system

Bischofferode, Germany
Installation of shaft sealing



Shaft sealing system for gas
Schematic design

UNDERGROUND WASTE DISPOSAL

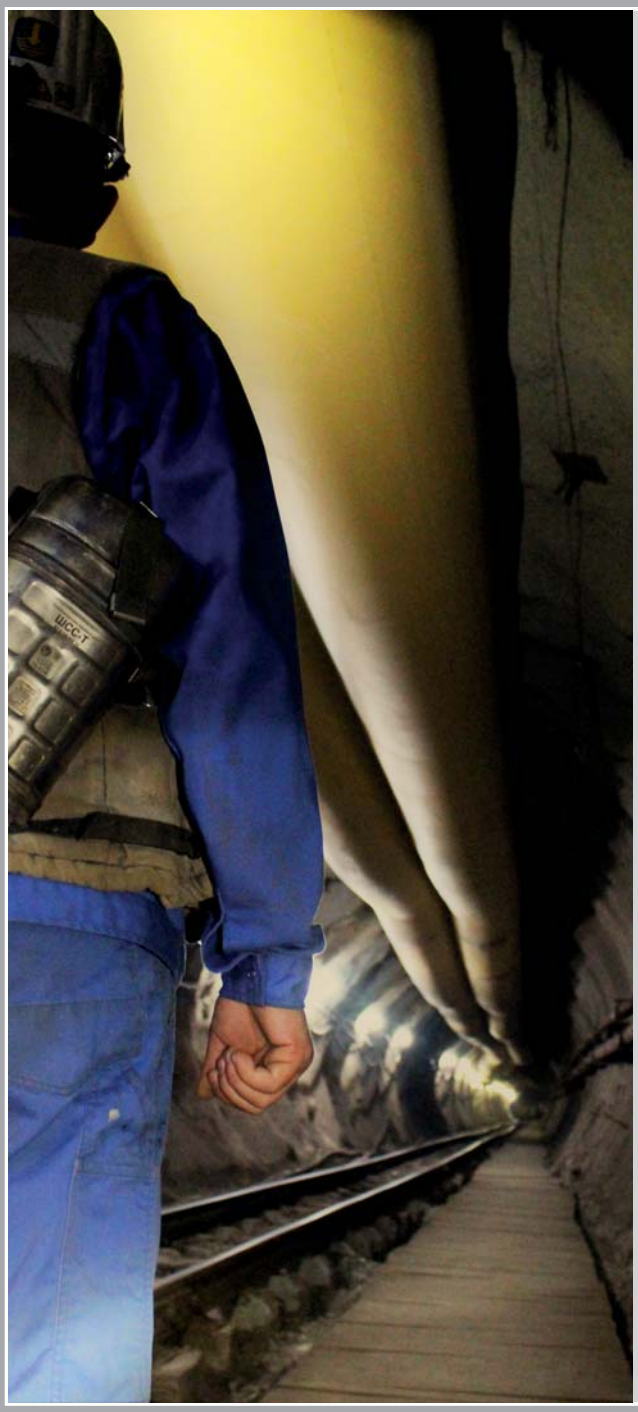
Our experts of Schachtbau Nordhausen, are able to offer know-how developing safekeeping underground cavities for the disposal of chemically toxic and radioactive waste. Our competencies contribute to solving the final disposal of radioactive waste in Germany and Europe. We plan and build infrastructure projects for above and below ground facilities, such as developing the emplacement transport route in the repository for low and medium-level radioactive waste of the Bundesgesellschaft für Endlagerung mbH – Konrad shaft.

Services of various kinds have also been and will be used for other repositories and experimental mines in Germany and Europe, e.g. planning, construction and equipment offered and performed. In addition, the provision of comparable services in mines for the storage and landfill of waste materials from a wide variety of industries is a large business area of us. The construction and operation of long-term, secure closing and sealing structures in shafts and routes of offset mines, underground landfill and other repositories are key competencies of Schachtbau Nordhausen. They establish the leading role of Schachtbau Nordhausen in Europe and around the world.

Waste Disposal Konrad, Germany
Underground waste disposal

Waste Disposal Konrad, Germany
Drilling of anchor

Waste Disposal Konrad, Germany
Removal work



BAUER MASCHINEN

BAUER SPEZIALTIEFBAU

BAUER RESOURCES

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