



Service Catalogue

One-stop services are the forte of Untergrundspeicher- und Geotechnologie-Systeme GmbH (UGS). The combination of project management, engineering, drilling and workover facilities in a single company allows the interfaces in your project to be reduced and solutions that take all aspects into account while guaranteeing safe and efficient operation to be attained. We are also happy to assume management for solution mining, first gas filling operations or your complete storage operation.



We give top priority to your requirements irrespective of whether you order a feasibility study or a turnkey underground storage facility. Here, you benefit from over 50 years of experience and our aspiration to always be flexible in reacting to new challenges. For example, Untergrundspeicher- und Geotechnologie-Systeme GmbH is involved in research into new market requirements and develops its own software and solutions for handling complex tasks.

For us, quality and safety are, a given. We are certified in all major systems and implement these successfully. Let us develop the best solutions together to make your project successful.

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ENGINEERING



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ENGINEERING



Engineering Services

Key Competence

- Geology
- Hydrogeology, groundwater and injection monitoring
- General rock mechanics
- Reservoir Engineering
- Drilling
- Leaching, Dissolution tests on core material, leaching simulation
- Well completion and testing
- Well integrity evaluation, management handbooks, WIMS
- Open hole und Cased hole logging, casing inspection
- First gas fill and residual brine discharge of caverns
- Flooding (water, NaCl or liquid mining waste)
- Brine conditioning, brine disposal
- Process and thermodynamic simulation
- Plant design and process engineering, plant hardware and process units
- Decommissioning of storage facilities, plug and abandonment of wells
- Renewable energies - Hydrogen, Helium, CO2 and CAES storage
- Geothermal energy
- Research and Development
- Development and construction of subsurface equipment and measuring systems

Studies/expert reports

- Location and Feasibility Studies, Scoping
- Due Diligence
- Process and equipment selection studies
- Equipment sizing and process design
- HAZOP Studies
- CAPEX/OPEX - estimation, evaluation and optimization
- Storage abandonment concepts, decommissioning studies
- Utilization concepts for former underground gas and oil storages facilities



ENGINEERING



Engineering Services

Engineering Planning

- Subsurface and surface engineering for all project phases (Basic/Detail Engineering and Construction), technical documentation
- Procurement or purchase of materials or services
- Hazard analysis, risk evaluation
- Project management, project controlling
- Project, safety and quality management
- Case-specific 3D simulation and modelling
- 3D Planning and construction
- Engineering, Procurement and Construction Management (EPCM)
- Engineering for turn-key projects
- Commissioning planning
- Disposal management
- Technical Consulting, Owners Engineer
- Expert and consulting activities
- Internal and external training courses

Approval Planning

- Planning approval procedure (BBergG/EnWG)
- Licensing procedures compliant with: mining legislation (BBergG), hazardous incidents regulations (12th BImSchV), energy legislation (EnWG), immission control legislation (BImSchG), water legislation (WHG), construction legislation (LBO, BauGB)
- Identifying explosion zones and explosion protection documents
- Safety reports and impact analyses
- Security of rights, permit participation procedures, acquisition of rights, compensation payments
- Licenses during project progression and on request
- Execution of HAZOP meetings



ENGINEERING



Engineering Services

Supervision

Subsurface

- Supervision with regard to generally recognized engineering practice and relevant regulations, IWCF certification level 3 - 4
- Technical assistance, backup engineering
- Supervision for logging and testing
- Commissioning Management for leaching, first gas filling and flooding facilities
- Storage operational monitoring

Surface

- Construction management/construction supervision
- Commissioning Management for leaching, first gas filling and flooding facilities
- Planning and accompanying of test and performance runs



ENGINEERING



Engineering Services

Research and Development

- Development and design of underground equipment, for example hydraulic pipe pulling systems, mechanical barriers for large-caliber wells
- Development, design and adopting of tension monitoring systems for recording and monitoring axial stress states of subsurface casings and equipment
- Development of special technical solutions for repairing old wells, new completion designs or re-entry of underground caverns
- Backfilling of brine-filled caverns by using solid materials
- Development and supervision of specific tracer applications for leak detection, tracer monitoring
- Advancement of calculation and simulation software, (leaching simulation - PCL, thermodynamics - TSCW, well integrity evaluation - SEW)
- Research on sector coupling and long term underground storage of renewable energies and geothermal storages
- Investigations on gas mixtures (i. e. storage conversions)
- Design of subsurface and surface facilities as well as development of subsurface storage technologies for alternative storage media (i. e. hydrogen, helium, CO₂, CAES)
- Planning, support and supervision of test operations and performance test for alternative storage media (i. e. helium, hydrogen)

R & D Projects/Research groups

- SMRI - measuring and monitoring systems for wells
- BVEG work/research groups - focus: renewable energies, underground hydrogen storage, failure and accident assessment and prevention policies
- HYPOS H₂-UGS, ESsCO₂, HyCavMobil (service provider), ProSalz



ENGINEERING



Drilling/Plug & Abandonment

Key Competence

- Drilling planning (incl. Landmark)
- Conductor pipe and water wells
- New wells (vertical, horizontal, directional, S-shape, side-track)
 - o Exploration wells
 - o Cavern wells
 - o Disposal wells
 - o Storage wells (in aquifers, natural mineral deposits, existing storage facilities, etc.)
 - o Geothermal wells
- Completing and/or repair of wells
 - o Open-hole and cased-hole completions
 - o Packer installation with and without subsurface safety valves
 - o Filter installations with gravel packs (incl. synthetic resin gravel packs)
 - o Milling and renewal of casing strings
 - o Partial backfilling (plugging) and deviation from wells
 - o Perforations
 - o Stimulation (acidifications, washings and clean ups, etc.)
 - o Installation of disposal wells with GRP pipes (last cemented casing)
- Plugging of gas storage, water and disposal wells in accordance with the applicable guidelines
 - o Re-workover and plugging of old wells
 - o Complete liquidation of storage facilities, e.g. UGS Ketzin (41 wells und 39 levels), UGS Buchholz (25 wells); UGS Berlin (21 wells)
 - o Plugging of wells with possible or known back tube circulation
 - Window milling into casing strings in a suitable sealing horizon zone
 - Setting and testing of cement bridges in window areas
- Coiled tubing, slick and wireline work, snubbing
- Discharging of pore space storage facilities to be decommissioned
- Storage facility management and production tests of pore reservoir storage wells (production and disposal tests)
- Reservoir modelling with 3D reservoir simulation (ECLIPSE)
- Process and technology development, e. g. drilling into an/or re-entry of storage caverns



ENGINEERING



Drilling/Plug & Abandonment

Software

- Landmark
- ECLIPSE
- UGS software tools for drilling planning and reservoir modelling

Super- vision

- Supervision IWCF Level 4: drilling, workover, coiled tubing, snubbing, test, slickline and wireline work, wellhead change, well P&A
- Supply of supervisors for acid gas storage facilities/operation



ENGINEERING



Completion/Testing

Key Competence

- Planning and specifying of subsurface work for re/completion and workover of cavern wells for the storage media: natural gas, helium, nitrogen, hydrogen, brine, oil, petrol and ethylene/propylene caverns:
 - o Workover, snubbing, coiled tubing, wireline and slickline work
 - o Plugging open hole areas by using cement bridges
 - o Milling and replacing of casing strings
 - o Tube-(in-tube) cementation
 - o Packer completions
 - o Liner completions
 - o Plugging of cavern wells
 - o Cavern neck conditioning (mechanical and hydraulic)
 - o Installing of subsurface equipment (pumps, plugs, valves, patches, gauges)
 - o Casing string perforations and cutting
 - o Installing of flood strings
 - o Retrieve/removal of old installations
- Planning of subsurface test work with regards to the integrity of the installed components and cementation in cavern and production wells, including:
 - o Tightness test of the last cemented casing shoe of caverns (gas, liquid)
 - o Functional test of completions and individual components
 - o Test work for leak localization and characterizing any leakages
- Design, planning and specifying of geothermal wells
- Process and technology development for underground storage cases, in particular for renewable storage media, e. g. hydrogen, CO₂, helium

Software

- Landmark
- CavInfo Software Suite (professional: Cav ViewII, CavMap, CavLog, CavWalk)
- UGS software tools for completion planning and test work

Supervision

- Supervision IWCF Level 4: workover, coiled tubing, snubbing, test work, logging, slickline work
- Supply of supervisors for acid gas storage facilities/operation



ENGINEERING



Storage Technologies/Geology

Key Competence

-
- Planning of exploration campaigns for the exploration of underground structures for storage purposes and for geothermal applications
- Geological planning/supervision for exploration, storage and geothermal wells, data analysis, core classification and reporting
- Planning, monitoring, analyzing and interpreting of open hole measurements and exploration campaigns, e. g. membrane interface probe, seismics, geoelectrics
- Developing of 3D structural geological models (Petrel)
- Generation of thematic and mining maps
- Leaching of brine-production and storage caverns by using oil, nitrogen or other blanket media, subsequent leaching of partially filled (oil, gas, petrol, diesel, ethylene) caverns, leach & fill, Solution Mining Under Gas (SMUG)
- Specific leaching procedures for the adaption of rock mechanically unstable cavern roofs, e. g. nozzle leaching procedures
- Executing and analyzing of dissolution tests on salt core material, deriving of leaching parameters, software-assisted leaching simulation (PCL, WinUbro)
- First gas filling and refilling of storage caverns
- Flooding of former storage caverns by using different flood media (water, NaCl or liquid mining wastes)
- Planning, interpreting and analyzing measurements during leaching operations, first gas filling and flooding processes (e.g. brine analytics, interface measurements, sonar surveys)
- General rock mechanical approach for cavern design and compliance with rock mechanical limiting specifications
- Developing abandonment and utilization concepts for wells and underground storage facilities
- Groundwater monitoring and monitoring of disposal horizons: Planning of measurements and sampling, supervising campaigns, management/analysis evaluation/interpretation of data, risk assessment
- R & D of storage technologies, e. g. hydrogen storage, solid backfilling of brine-filled caverns; managing of R & D projects (e. g. ESsCO₂, HYPOS H₂-UGS)



ENGINEERING



Storage Technologies/Geology

Software

- Petrel, GeoDIN, ArcGIS, WellCAD, CoreIDRAW, WinUbro (Ubro4), CavInfo Software Suite (professional: Cav ViewII, CavMap, CavLog, CavWalk)
- UGS software: PCL - Planning of Cavern Leaching, KAVENT (gas fill, flooding), STW Brine, STW Gas

Supervision

- Supervision IWCF Well Intervention/Level 4: logging (open hole logging, cased hole logging), sonar survey, Pull/Setting/Test of subsurface safety valves, workover, sampling and measurements during groundwater monitoring
- Supply of supervisors for acid gas storage facilities/operation



ENGINEERING



Well Integrity/Product Development & Applications

Key Competence

- Generation of well integrity management handbooks
- Technical assessment of the subsurface components of underground storage facilities and hydrocarbon deposits, lifecycle
- Integrity evaluation of storage and pore storage wells
- Re-evaluation (subsequent assessment) of plugged wells
- Evaluation of technical incidents, e. g. string demolition, slip systems, SSSV pressure surge issues – expert assessments
- Mining damage related analyses of wells
- Assessment and interpretation of anchor casing string measurements – transition to the mounting flange
- Annular space management
- Assessment and interpretation of cased hole measurements, high resolution multifinger caliber incl. pipe connectors diagnosis, conventional multifinger caliber, ultrasonic wall thickness measurements, electromagnetic wall thickness measurements, cement bond logs, cement imaging techniques, noise techniques, fiber optic measurements, measuring techniques for evaluating the cement bond
- Casing inspection incl. the verification of functionality
- Running in of welded tubes, welding of subsurface equipment
- Deployment of specific subsurface equipment: casing jack (hydraulic lifting device) and spider plug (mechanical plugging device for enlarged boreholes/cavern necks)
- Construction and production support: subsurface equipment, wellhead/cavern wellhead equipment
- Developing, installing and support of tension monitoring systems for recording and monitoring axial stress states of subsurface casings and equipment
- Material analysis of subsurface equipment
Research and development of custom solutions and technologies for subsurface and surface applications, e. g. activatable tie back seal unit

Software

- ANSYS, INVENTOR, DIADEM, CATMAN, AUTOCAD, CorelDRAW, WellCAD
- UGS software: SEW – Safety Evaluation of Wells, STW Brine, STW Gas

Super-vision

- Supervision IWCF Level 4: test work, logging (cased hole), slickline work, welding
- Service Operator: assembling and commissioning of spider plugs, casing jacks, tension monitoring systems (TMS, DMS), wellheads, custom solutions



ENGINEERING



Surface Technologies

Key Competence

- Engineering for gaseous and liquid products (production, measurement, processing) of surface facilities for underground storages (regenerative/fossil storage media), including gas connections for storage wells, e.g.
 - o Gas dehydration facilities
 - o Gas optimization plant and pipe storage
 - o Leaching stations, leaching facilities
 - o Debrining facilities (engineering, supply)
 - o Flooding facilities (engineering, supply)
 - o Metering units
 - o Pump containers (engineering and supply)
 - o Double wall systems (for condensate, glycol)
- Gas pressure control and measuring stations (certified by DVGW for planning)
- Consultancy services, owners engineer
- Modifying and optimizing existing plant
- CAPEX, OPEX assessments and case studies
- Support for plant operation (cost reduction/troubleshooting)
- Field lines compliant with German federal mining law - BBergG (engineering, supply)
- Dismantling of surface facilities and storage sites, recultivation

Software

- UNISIM by Honeywell (process simulation) based on previous use of Pro II and AspenPlus
- CONVAL (flow calculations, control valves and orifices)
- SulDry (arrangement of glycol gas dehydration facilities)
- 2D planning with AutoCAD V 17
- 3D planning with Plant 3D
- Process flow charts and P&I diagrams with AutoCAD PID
- Building(s), steel construction and receptacles with INVENTOR
- Strength calculations with Dimy V 5, Rev. 12.3
- UGS software tools for heat exchangers, filters/separators and vents, pressure loss calculations, cavern thermodynamics, materials data and phase equilibria, two-phase flow, document management

Super-vision

- Construction supervision and management
- Construction progress supervision
- Commissioning Management for leaching, first gas filling and flooding facilities



DRILLING SERVICES



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General Services
Engineering
Supervision

Testing

Rig Services

Drilling/Workover
In-house Drilling and Workover Plants



DRILLING SERVICES



General Services

Engineering

- Draft planning (conceptual) with raw cost estimation and schedule
- Technical equipment specification
- Work discussions and specialist meetings with service providers
- Technical/economic tender evaluation, preparation of placing recommendations
- Checking order confirmations
- Participating in negotiations with government agencies
- Organising and scheduling the entire project sequence
- Preparing risk assessments
- Coordinating service trade interfaces
- Project, safety and quality management (HSE)
- Engineering and implementation using Landmark®
 - o Drill path planning including anti-collision analysis
 - o T&D calculation
 - o Hydraulics analyses
 - o Casing design
 - o Cementation simulation, including stand-off analysis
 - o Real-time reproduction of survey data
 - o Independent logging comparison using MWD data (azi, inc)

Works Monitoring - Supervision

- On-site project execution works management and monitoring with regard to compliance with the planned and coordinated schedule, as well as generally recognised engineering best practice and the relevant regulations
- Engineering monitoring
- Maintaining documentation such as daily reports
- Holding site and safety meetings
- Coordinating the service and supply companies involved in work implementation
- Coordinating with government agencies, experts and authorised third-parties
- Cost monitoring and auditing (technical and commercial)
- Compiling final documentation (including proof of disposal)



DRILLING SERVICES



Testing

- Wireline work up to 3000 m & pressure equipment, with 6 m lubricator, hydraulic stuffing box
 - o At-rest, flow, layer pressure and long-term measurements using digital depth gauges
 - o Temperature profiles
 - o Level measurements
 - o Water, gas, solid substance sampling
 - o Calibre measurements, dummy runs
 - o Conditioning
 - o Pipe shoe and artificial end depth measurements
 - o Sampling spoons, scrapers, swaging tools, sand pumps
- Groundwater monitoring/gauge inspections
 - o Pressure/temperature monitoring
 - o Level measurements/water level dipmeter
- Tubular Running Services (up to 11³/₄")/computer controlled (up to 5 ¹/₂")
 - o Controlled screwing of casing and tubing strings
 - o Drill/production/evacuation strings
 - o MIT/tubings
 - o Pipe removal and installation in shafts
 - o Drilling equipment (horizontal tongs)
- Pressure testing works
 - o Drilling systems (gate valves, hoses, push rods, risers, manifolds)
 - o Testing equipment
- Testing works
 - o Production testing
 - o Performance testing
 - o Functional testing
 - o MITs hydr./pneum. casing string, pipe shoe, head
 - o Pressure testing hydr./pneum.
 - o Leak detection
 - o Data loggers, head pressure measurements
- BPVs
 - o Installing one-way and two-way valves in wellheads

Testing



DRILLING SERVICES



Geostock

- Conceptualising, planning and analysing underground testing works in terms of the integrity of installation components and cementing at caverns and production wells, e. g.:
 - o Leak testing of the casing shoe on the last cemented casing in storage caverns (gas/liquid)
 - o Functional testing of completions and individual components
 - o Test work for leak localisation and characterisation
- Supervising testing works
- Maintenance works
 - o Repairing/maintenance of power tongs, gate valves, test heads
 - o Calibrating drillometers/measuring technology/pressure gauges/tensile force meters/pressure cells/dynamometers
 - o Servicing wellheads (sealing, lubricating, painting)
 - o Servicing/repairing high-pressure compressors
 - o Servicing/repairing maximisers/dosing pumps
- Servicing works on drilling/workover facilities
 - o Drillometer assembly and servicing
 - o Measurement display, e. g. for pressure, torque, strokes, revolutions
 - o Acceptance and calibration of M&C systems
 - o Designing customised software applications for drilling process data acquisition
- Miscellaneous
 - o annulus level measurements
 - o annulus level lowering
 - o annulus level filling
 - o Well flush production
 - o Assistance for measurement work by external companies
 - o Provision of TRS-Personnel
 - o Assembly work (flanges, preventer for drilling rigs)
 - o Leak detection



DRILLING SERVICES



Rig Services

- Maintenance and repair works
 - o post-operation-maintenance, inspection and identifying scope of repair necessity
 - o Cleaning and painting work on equipment
 - o Crack inspections (NDT) on tools and welds
 - o Maintenance and servicing works on steel structures, vessels, pumps and mud treatment systems
 - o Repairing motors, transmissions, mechanical, hydraulic and pneumatic systems
 - o Reinstatement work on hoists and pulley systems
 - o Inspection of drilling masts after sandblasting
 - o Repair and pressure testing works on preventers
 - o Carrying out inspections on pressure vessels in cooperation with TÜV
 - o Reinstatement work on chassis of self-propelled machines
 - o Preparing Rig Trucks for general inspections
 - o Repairing generator sets, electrical switchgear and distribution systems
 - o Renewing electrical installations
 - o Testing electrical systems
 - o Welding work by our own trained welders under the supervision of a welding engineer in line with the acquired qualification certificates
 - o Spectral analysis of steel materials before carrying out welding work
 - o Fabrication of repairable or equipment parts in our own fitter's and machining shop

- Service works on or for drilling and workover systems
 - o Transport of drilling and workover rigs
 - o Obtaining a special permit for wide and heavy load transportation
 - o Rig up and down of drilling and workover rigs on site
 - o Inspection of the facilities by an appointed Rig-Expert in accordance with BVOT (regulations from German Mining Authorities)
 - o Troubleshooting and repairs to mechanical, pneumatic, hydraulic and electrical systems, including on duty service
 - o Developing the electrical infrastructure to supply the drilling and workover facilities, including equipment and containers
 - o Electrical acceptance of drilling and workover facilities by a responsible person appointed in accordance with *EIBergV* (mining regulations for electrical facilities)
 - o Revision of portable electrical equipment
 - o Establish equipotential bonding and metrological proof in accordance with VDE 0100 for service companies on the site



DRILLING SERVICES



Rig Services

- Logistics and supplies for drilling and workover rigs
 - o Providing equipment, consumables and spare parts from stock, including on duty service
 - o Equipment rentals (flanges, well control equipment, drill string components, vessels, pumps, etc.)
 - o Transportation to sites by hauliers or using your own HGV
 - o Transportation by HGV, including on weekends and public holidays, using existing special permits
 - o Providing gas measuring devices and organising their readiness for use

- Engineering
 - o Planning for erection and dismantling of drilling and workover facilities on the sites
 - o Developing site layouts, fire-protection, escape plans
 - o Planning for changes in standard equipment for installation in confined spaces
 - o Providing structural analysis documents for erection of drilling and workover rigs on existing foundations, taking into account current operating cases in cooperation with approved structural designers
 - o Technical acceptances on the sites in acc. to authority regulations
 - o Organising noise measurements at operating sites
 - o Compiling forecasts for noise propagation from drilling/workover rigs
 - o Cataloguing existing equipment using a CAD system to optimise complex repair processes
 - o Developing repair solutions for your own equipment if no longer supported by the manufacturer or delivery times for spare parts are unacceptable
 - o Requirements planning and procurement of spare parts and replacement assemblies
 - o Developing servicing and revision plans
 - o Organising and coordinating external service providers for servicing and repair works
 - o Documenting inspections, servicing and repairs in the IT system
 - o Monitoring the due dates of inspections and servicing according to running time and operating hours and the resulting necessary order control
 - o Designing new equipment parts using a CAD system
 - o Determining requirements, concept development and planning new equipment and facilities
 - o Commissioning and production monitoring for new equipment
 - o Developing operating and servicing instructions



DRILLING SERVICES



Rig Services

- Developing risk assessments and operating instructions for new or existing equipment
- In-house employee training to acquire the ability to operate floor-controlled cranes
- Advising on the selection of personal protective equipment against falling
- Annual inspection of personal protective equipment against falling
- Inspecting lifting accessories compliant with DGUV 100-500
- Re-stamping materials and products compliant with DIN EN 10204
- Monitoring measuring and testing equipment compliant with ISO 9001



DRILLING SERVICES



Drilling/Workover

- Storage wells
- Directional and horizontal drilling
- Exploration wells
- Prospect drilling
- Geothermal wells
- Completion, Re-Completion
- Repairs, P&A
- Workovers (casing running, sonar surveys, ...)
- Testing and investigation works in selected geological horizons
- Rock compression strength measurements
- Leakage tests
- Deep sampling, level determination, monitoring
- Providing safety supervision on drilling and workover facilities
- Providing construction supervision on drilling and workover facilities

References: > 500 boreholes in more than 60 years

- | | |
|---------------------|-------------------|
| ○ Exploration wells | 2 000 m – 4 800 m |
| ○ Aquifer wells | 400 m – 1 000 m |
| ○ Production wells | 1 000 m – 1 100 m |
| ○ Cavern boreholes | 800 m – 1 800 m |
| ○ Disposal wells | 1 000 m – 1 200 m |
| ○ Geothermal wells | 1 500 m – 4 300 m |



DRILLING SERVICES



Drilling/Workover

In-house Drilling and Workover Plants

RIG T 53
Cabot Franks 200



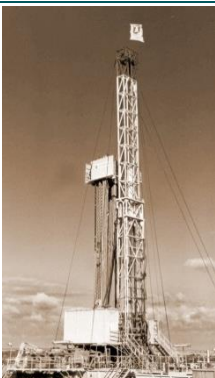
- nominal gross capacity: 64 t
- Mast length: 21.95 m
- Power input: 326 HP
- Table: SA 110

RIG A 52
Cabot Franks 500



- Nominal gross capacity: 95 t
- Mast length: 31 m
- Power input: 355 HP
- Table: SA 175 hydraulic

RIG T 10
Cabot Franks 900



- nominal gross capacity: 165 t
- Mast length: 34,20 m
- Table: C 275
- Mud pump: F 1000 Triplex



DRILLING SERVICES



Drilling/Workover

In-house Drilling and Workover Plants

RIG T 11
Cabot Franks 650



- nominal gross capacity: 122 t
- Mast length: 31.00 m
- Power input: 520 HP
- Mud pump: F 1000 Triplex

RIG T 12
IRI Franks 900



- nominal gross capacity: 181 t
- Mast length: 34.20 m
- Table: LR 275 L
- Mud pump: 2 x 1.000 HP Triplex

RIG 110
TSM 1200 HP AC



- nominal gross capacity: 183 t
- Mast length: 36.60 m
- Top Drive: Tesco 250 HMI
- Table: Oilwell B 27 ½
- Mud pump: 2 x TPK-1.600, je 1.600 HP Triplex



DRILLING SERVICES



Drilling/Workover

In-house Drilling and Workover Plants

RIG T 20
Crown Duke 1000



- nominal gross capacity: 200 t
- Mast length: 37.40 m
- Top Drive: Tesco 250 HMI
- Table: RK 275
- Mud pump: 2 x F 1000 HP Triplex

A large quantity of the remaining drilling equipment (tank system, well safety equipment, drill rods, transitions; drilling tools, flanges, etc.) is available and is used according to the respective application. Depending on the requirements, the drilling and workover facilities can also be equipped with a range of different equipment.

All drilling foremen are IWCF Level 4 certified, all shift supervisors are IWCF Level 3 certified. The drilling team generally has IWCF Level 2 certification.

There are at least two first aiders per shift on the site and all managers are SCC certified.



OPERATION



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General Services

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Maintenance

Dispatching

Administration

Software



OPERATION



General Services

Commissioning and operating third-party facilities, such as

- Leaching, brine preparation and brine supply facilities
- Initial cavern gas filling facilities
- Cavern flooding facilities
- Complete surface systems in commercial gas operations
 - o as cavern storage facilities
 - o as pore/aquifer storage facilities
- Heat generation plants
- Grid injection systems

Operating third-party systems up to 250 bar for the following process media

- Natural gas
- Condensates
- Helium
- Nitrogen
- Full brine, depleted brine
- Potable and non-potable water
- Diesel
- Glycol, methanol
- Hydrogen

Operational management by performing services in

- Process control
- Maintenance
- Dispatching
- Administration, individually or in combination for the respective third-party facility



OPERATION



Process Control

- Process control by authorised control room staff appointed in accordance with mining law, employed in 24/7 rotas
- Process control supported by field staff
- Monitoring operations and performance of all operational and control activities associated with facility operation, e. g.
 - o Controlling/operating technology at various operating levels, particularly in the context of start-up and shut-down processes for both the entire facility and redundant sub-areas
 - o Setting/adjusting process parameters
 - o Realising modes of operation and performing switching operations
 - o Monitoring all technical facilities across different monitoring levels, in particular:
 - Operating status of facilities and sub-facilities and their interdependencies
 - Limit value approximations for remotely monitored measuring points (pressure, temperature, quantity, level, gas quality)
 - Setpoint deviations in operational systems
- Backing up internal and external information flows including communications with competent authorities; fulfilling function as “permanently staffed unit” or “central reporting point”
- Remote process control via our own control room in Mittenwalde, Germany



OPERATION



Maintenance

- Planning maintenance measures, e.g. for annual planning, schedule and cycle administration of individual plant components, particularly systems that require monitoring
- Implementing work permit/work authorisation procedures
- Compiling inerting and gas admission plans
- Implementing start-ups and shut-downs, incl. LOTO management
- Performing last-minute risk analyses (LMRA)
- Performance of functional tests by qualified personnel, e. g. for leak testing Christmas tree valves, gas pressure regulators, liquid separators, etc.
- Implementing servicing measures, e. g. on gas dehydration units, testing for leakage in vessels and pipelines, performing functional checks of flow controls and locks
- Organising all special maintenance measures that must be implemented by special companies, e. g. for fire alarms, gas warning systems, etc., and tests by qualified staff; integrating and coordinating experts in special cases of need
- Carrying out repair work, troubleshooting, remedying faults; carrying out logistical work such as operating cranes, mobile lifting equipment and work platforms
- Evaluating the condition of all mechanical plant components
- Spare parts management (specification, procurement, checking incoming items)
- Inventory management (fuels, spare parts, administration of incoming and outgoing items)
- Measuring and controlling wells and gauges, e.g. ground-air measurements and leakage tests
- Pigging field pipelines
- Sampling, analysis in field lab
- Technology and security labelling and signage



OPERATION



Dispatching

- Providing communications technology for data exchange between partners involved,
e. g. FTP, EDIGAS V4.0 XML Format or higher, AS2/AS4
- Priority use of EIC code with partners involved; use of other specific codes if necessary
- Recording plant availability and reporting restrictions to distributors
- Recording all incoming nominations
- Implementing matching process and comparing storage use with gas transmission
- Compiling daily movement schedules: overall, per connection point, per storage user
- Allocation and account management
- Compiling user-specific reports, e.g. daily statements, monthly overviews, utilisation graphs etc. at certain times/after certain cycles
- Implementing in 24/7 rotas, either centralised or decentralised



OPERATION

Administration

- Assuming organisational responsibility, as well as expert technological and organisational supervision, of the third-party facility in accordance with mining law
- Compiling inspection reports
- Compiling project-specific health and safety documentation, including emergency management
- Initially compiling and updating hazard assessments, including allocating inspection intervals and inspectors to facility components and working resources
- Preparing work permit/work authorisation procedures
- Compiling facility-specific instruction schedules
- Compiling and managing project-specific, coordinated operational documentation
- Ensuring the requirements of legally robust documentation are adhered to
- Defect tracking and warranty management
- Procedural and energy process optimisation
- Implementing waste and disposal management in the electronic waste recovery procedure
- Implementing hazardous substances management

Software

- Providing modular, adaptable operations management software with various information interfaces (in-house database development, web-based)
Using software provided, such as SAP R3, Cavbase, Nomix

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