

Technical Specification

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1. Overview of planning jobs

Brief description (just for information and a better understanding of this tender), it is planned to buy and install electric driven control panel with hand pump backup (total estimated number approx. 175 pcs) with delivery time 2013 – 2017.

For more information about our requirements on the control panels please see **annex A**.

2. General properties single well control panel

- **Cabinet**

The cabinet will be made out of stainless steel with front and rear doors with locking facilities. The front doors will contain a viewing window which permits monitoring of the system without panel entry.

- ESD push buttons to close SCSSV and SSV
- QUIT push button – to recover normal function after reasons for closure of the valves is gone (both automatic closure by pilot function and by ESD button)
- Pressure gauges for SSV, SCSSV, Pump (contact gauge) and control panel pressure, pressure gauges with the same diameter and scale with psi, MPa.
- Signal lights (open/close indication) for SSV, SCSSV

Those components are visible from outside via a window.

The rear door will give entrance for maintenance. Dimension of the cabinet should be sufficiently (width = 700 mm, height = 1700 mm, depth = 600 mm see **annex C**) our proposal. The cabinet will be equipped with a stainless steel drip tray with a drain valve outside the cabinet.

The cabinet will be equipped with the inner side of insulation to prevent heating discharge. Inside the cabinet a reservoir will be installed with capacities min. 20 and max. 25 litres. This reservoir will be equipped with suction filter, drain valve; level gauges and level switch for alarming set point and set point motor stop function for prevention of dry running of the motor pump combination (ATEX regulations). The reservoir will have an exhaust to the outside with flame arrestor in case of eventual contaminated oil.

- **Main parts**

Please fill annex B.

- Cabinet
- Electric motor (we require from one supplier during contract in case of non-failure operation)
- Hand pump (we require from one supplier during contract in case of non-failure operation)

- Accumulator
- Solenoid valves (we require from one supplier during contract in case of non-failure operation)
- Filters
- Oil reservoir
- Junction boxes
- Check valves
- Relief valve
- Inside space heater
- ESD valve, Fusible plugs
- Pressure transmitter for low pilot function
- Pressure transmitter for each safety valve hydraulic circuit
- Hydraulic fluid (will delivered by supplier for this application, please fill **annex B**. Part hydraulic fluids table)
- Control unit (PLC) – reads all the signals from the field and implements all algorithms that control the pump motor, solenoid valves, signal lights, including pilot functions. Control unit will also communicate all the field signals it has with the local node of UGS control system. The UGS control system operators will be able to set the pilot function pressure limits, pressure gradient values (pressure drop, time) and will be able to perform ESD function remotely. Communication with the UGS control system will use Ethernet connection and MODBUS TCP protocol. The MODBUS map will contain as much information as possible. Remote ESD function will be done by hard-wire signal from the local node of UGS control system (digital output, 24VDC) to control panel control unit (digital input, 24VDC). PLC will be SIL 1 compliant as well as the pilot function pressure transmitter.

Please see Annex D

The control panel must be designed so that in the case of exchange of individual components (solenoid, hand pump...), the operator would not have to bleed off pressure from whole system of control panel (shut down SSV, SCSSV). It means that the control panel will allow exchanging individual components without closing SCSSV and SSV.

- **Control and safety philosophy**

The system will be run by one electric motor pump combination (230/400 V, 3 phases, 50 HZ). A pump HAND/AUTO switch will be installed to avoid frequent short starts/stops of the pump during the period of depressurization. The operation mode of the pump must be at least 2 minutes.

In AUTO mode the signals from the valves pressure switches will be used by the control unit for start and stop function of the pump:

- | | | |
|-------------------------|---|-------------|
| ➤ Low pressure | = | Start pump, |
| ➤ High pressure | = | Stop pump, |
| ➤ Low Low level in tank | = | Stop pump, |

In HAND mode the pump motor will be locally controlled.

The system will include hand pump as back-up for failure of motor pump combination. The hand pump is also required for back-up with a total electrical failure. Solenoids must be equipped with an override option. Solenoid valves must have a manual reset function (after a shutdown the solenoid valve needs to be reset locally before start-up) via **QUIT push button**.

Closing of SSV and SCSSV will be initiated by the control unit by:

- Fusible plugs
- low pilot (pressure limit or pressure drop)
- local ESD button
- remote ESD function from UGS control system operator
- other conditions (loss of power)

As soon as the reason for closure passes over, operator may restore system to normal operation by pushing the QUIT button placed directly on control panel.

The control circuit must be protected against over pressurization through the use of relief valves. The output lines must be equipped with pressure gauges for local read out, pressure switches and red / green signal lights for indication of open or closed SSV and SCSSV.

Minimum output pressure for SCSSV must be 4500 psi and maximum output pressure for SCSSV must be 5.000 psi. Minimum output pressure for SSV must be 1000 psi and maximum output pressure for SSV control must be reduced to 3.000 psi.

The hydraulic safety system must close first SSV and SCSSV (with 20-30 second delay) in case of fire (fusible plug will be damage) or low pressure in pipe line (low pilot reaction).

- **ESD pushbutton**

For ESD signal pushbutton will be installed maximum 10 m from control panel.

- **Accumulator**

Accumulator with capacity (minimum 5 litre or more) for pulsation dumping will be bladder type and will be equipped with a block and bleed valve.

- **Environmental spec.**

The individual electrical devices are designed to operate in an ATEX Zone 2. All components must meet the requirements and certifications allowed to work in this area. EX-D rated components will be used.

ATEX-certification for components will be minimum defined as follows:

- | | |
|-----------------------|--------|
| ➤ Above surface | II |
| ➤ Area classification | Zone 2 |
| ➤ Gas use | G |
| ➤ Gas group | IIB |
| ➤ Temperature class | T3 |

- Ambient temperature $-29^{\circ}\text{C} < T_a < +40^{\circ}\text{C}$

Panel must be ATEX certificated by 3rd party – the statutory declaration of ATEX certification of the third party and the name of the person who will perform it.

For winter conditions panel must be equipped with heater with thermostat with a set point of +5°C.

- **Filters and suction strainers**

High pressure filter must be installed behind pump. This filter must be able to by-pass. Both pumps (motor & hand) suction lines must be equipped with a filter.

- **Installation kit**

Installation kit must cover all main material necessary for SSV, SCSSV and control panel connection. Distance between wellhead and control panel will be maximum 10 m. Installation kit must be able to anchor to the panel surface.

As installation material we understand tubing, fittings, fusible plugs, hydraulic oil etc.

- **Low pilot**

Low pilot – the pressure transmitter will be installed in the gas flow-line and connected to the panel control unit of SSV and SCSSV. In case of the pressure in gas flow-line drops below the pre-set value low pilot must react to it by bleeding off the hydraulic oil from system.

Low pilot will be pre-set by supplier. RWE Gas Storage will provide information about pre-setting pressures for individual UGS.

Pressure transmitter range: 0 – 200 bar

Precision: 0,5 – 1 %

Execution in the Ex

Use in external environment IP – XX

3. General technical information

- **Instruments, couplings and tubing**

All instruments, couplings and tubing must be AISI 316 SS. Swagelok double ferrule compression fittings will be used. The tubing's basically used in the hydraulic unit are seamless, fully annealed, imperial size: ¼", ⅜" and ½" O.D. all relief valve's exhausts and block & bleeds valves will be tubed back to the hydraulic reservoir to prevent unwanted oil spillage in the cabinet.

- **Threads**

All threaded connections inside the control panel may be according to the manufacturer, but output threaded connection we require in SI units.

- **Nameplates**

All instruments mounted on the front and inside of the cabinet and also the bulkhead connections must have a nameplate. The nameplate must be permanently fixed where feasible. Nameplates will be in English and Czech language. Final Czech wording will be set with cooperation with RWE Gas Storage representative

The control panel will have nameplate with information about:

- manufacturer
- type of product
- serial number
- year of manufacture
- weight
- number of ATEX
- CE mark

Also require colour coding the tubing's for:

- SCSSSV
- SSV
- return lines/releasing lines

4. Documentation & certification

- **Documentation**

The following documentation must be included:

Tender documentation (will be sent with offer):

- GA drawing, (schematic drawing will describe all components and threads of the control panel, the drawing of connection to SCADA, the drawing of cabinet, scope diagram of single well control panel)
- Design calculation
- Part list

Following documentation shall be delivered together with the delivery of goods (control panels) (see annex A, part IX. Documentation/Certification requirements) and:

- Test reports (pressure certification, functional test report)
- Test procedures
- Product certificates
- Shipping documents
- Stocking conditions

- Installation Operation Manual and Manufacturing Data Book

Requests to documentation:

- in English language
- 1 original + 2 copy (paper form ; A4 format 80g/m²)
- 1 copy (CD pdf.-format)

- **Certification**

The following certification must be included as per specification in above mentioned documents:

- PED certification on pressure equipment – Statutory declaration about Certification
- ATEX certification on assembly by third party

The Contracting Entity recommends to use notified body i.e. TUV, Norske Veritas, Loyd.

- **Quality assurance**

Each system will be fully tested before delivery. RWE Gas Storage reserves the right to participate in control panel pressure tests.

The Contracting Authority reserves the right to make technical inspection before delivery (inform 30 calendar days before delivery).

5. Other requirements

- **Training**

We also require training for our staff for operation and maintenance. This training (approx. 2 days) we require to do every year during contract validity.

Training location will be UGS Dolni Dunajovice and UGS Lobodice.

Training scope:

- introduction of the product
- main parts description
- operational and maintenance principal
- trouble shooting

- **Installation**

Each control panel will be installed on the well site by specialist from supplier. Specialist from supplier connect control panel to SCSSV, SSV, electric line, ESD/fusible plugs and to PSL (pilot's pressure range setting).

After installation of control panel it will be made functional and operational test and will issue protocol of installation signed by responsible person of supplier and acceptance signed by responsible person of client. (ie. job ticket, installation protocols or similar).

In case that the installation of control panel will be performed by supplier, its obligation will be to pick up the control panel from Hrušky warehouse, transportation to the location, installation and functional and operational test.

The installation will be carried out with the participation of representatives of the Client and will be issued with job ticket (based on the actual performance).

Installation location:

UGS Tvrdonice, UGS Dolní Dunajovice, UGS Štramberk, UGS Lobodice, UGS Třanovice.

Distance from warehouse Hrušky to locations:

- from warehouse Hrušky to UGS Tvrdonice – 3 km
- from warehouse Hrušky to UGS Dolní Dunajovice – 40 km
- from warehouse Hrušky to UGS Lobodice – 125 km
- from warehouse Hrušky to UGS Štramberk – 200 km
- from warehouse Hrušky to UGS Třanovice – 235 km

- **The installation schedule**

For every year the winning bidder will receive an installation plan (forecast). Call off for services will receive the winning bidder minimum 10 calendar days before each installation. The responsible persons for client will be - Ing. Lukas Svozil, Ing. Peter Zidisin. The responsible person can appoint 3-rd person (supervisor) to participate the job at each locality.

- **Spare parts**

During the contract, we require you to hold the spare parts for two sets of control panel (without cabinet and tubing's).

We require delivery time for spare parts one week from sending the request. Also we require stating the fixed price list of spare parts during the contract (2013 – 2017).

After the contract i.e. after 2017 we require that the contractor keeps the prices of spare parts for 2 additional years.

If contractor uses spare parts for warranty service he is obliged to restock his stock no later than 3 months or according the time of delivery in the essential time needed.

- **Delivery schedule**

Contractor is obliged to deliver the material for particular year based on individual order according to the signed contract, if not stated otherwise.

Estimated deliveries per year:

2013 – 50 pcs

2014 – 50 pcs

2015 – 25 pcs

2016 -25 pcs

2017 -25 pcs

- **Packing condition**

Each control panel must be delivered in wooden box including 1 copy of the documentation, secure for damage during transportation.

- **Connection to the SCADA**

Panel control unit will communicate with the local node of UGS control system at least:

analog values:

- oil pressure in both SSV and SCSSV valve hydraulic circuits
- gas pressure from the pilot function pressure transmitter

discrete values:

- oil tank level LOW and LOWLOW
- pump motor running signal
- SSV valve state (opened/closed)
- SCSSV valve state (opened/closed)
- all solenoid valves state
- ESD button

Remote ESD signal will be hard-wired as a digital input of panel control unit.

- **The warranty period**

The guarantee of 36 months from date of delivery is required. For installation service 14 days (we consider trouble free operation after installation).

- **The warranty service**

Reacting time must be no later than 10 calendar days from call off. Identification of the problem must be done within 48 hours, if not agreed otherwise by client. When a problem is identified must be solved within 14 calendar days.

Appendix:

Annex A: Check List - Single Well Control Panel

Annex B: Complete list of Material and Hydraulic fluids suitable for this application

Annex C: The cabinet – our proposal

Annex D: Schematic drawing