OIL & GAS DEVELOPMENT COMPANY LIMITED
PROCUREMENT DEPARTMENT, ISLAMABAD
FOREIGN SECTION B

(To be completed, filled in, signed and stamped by the principal)

ANNEXURE 'A'

Material PROCUREMENT OF WELLHEAD CONTROL PANEL.

Tender Enquiry No PROC–FB/CB/PROD–4554/2019

Due Date

Evaluation Criteria FULL

SCHEDULE OF REQUIREMENT

Sr No	Description	Unit	Quantity	Unit Price (FOB)	Total Price (FOB)	Unit Price C & F BY SEA	Total Price C & F BY SEA	Deviated From Tender Spec. If Any
1	WELLHEAD CONTROL PANEL, DUAL PUMP, PRESSURE RATING FOR SSSV 0–10000 PSI & PRESSURE RATING FOR SSV 0–4000 PSI. WITH HI–LO PILOT AND ALL ACCESSORIES. DETAIL SPECIFICATIONS ARE ATTACHED AT ANNEX–Z	Unit	15					

Note: NOTE:1.PAYMENT WILL BE MADE AS PER THE FOREIGN PROCUREMENT PAYMENT TERMS AVAILABLE AT OGDCL WEBSITE (TENDERS TAB).02:PURSUANT TO TENDER CLAUSE # 2.2, 11.4, 13 & 35.3.2, A BID BOND OF USD 9,000/–OR EQUIVALENT IN PAK RUPEES, MUST BE SUBMITTED WITH THE TECHNICAL BID AND IT MUST BE VALID FOR 150 DAYS FROM THE DATE OF OPENING OF THE BID.DELIVERY PERIOD FOR THESE ITEMS IS 04 MONTHS ON C&F BY SEA KARACHI FROM THE DATE L/C IS ESTABLISHED.

SPECIFICATIONS FOR PNEUMATIC DRIVEN WELLHEAD CONTROL PANEL

Project: **Wellhead Control Panels for Various Production Fields.**

Oil & Gas Development Co. Ltd.

CONTENTS

1.0 INTRODUCTION

1.1 Description

Oil & Gas Development Company Ltd. (OGDCL) is operating Oil/Gas fields in various parts of Islamic Republic of Pakistan.

OGDCL has planned to purchase Wellhead Control Panels for monitoring & control of producing wells. The Wellhead Control Panel (WHCP) shall be used to operate hydraulically actuated Sub Surface Safety Valve (SSSV) and Surface Safety Valve (SSV). Both SSV & SSSV are already installed and hydraulic operated and not in vendor's scope. The WHCP should be capable of automatically shutting down the SSSV as well as the SSV in response to various alarm conditions requiring shutdown either through pneumatic logic (Fusible plug loop, ESD loop, Pressure Pilots etc.) or through RTU using solenoid valve.

1.2 Vendor Responsibility

The Vendor shall be responsible for the complete design, manufacturing and testing of the Instrumentation equipment in the package unit in accordance with this specification and the compliance with applicable codes, standards, specifications and regulations issued by the organizations listed in Section 2.

The Vendor shall confirm/do the following:-

- Define all instrumentation systems and controls required to ensure satisfactory continuous operation. This shall include all instrumentation systems required for satisfactory start-up and shut-down of the equipment.
- Ensure that adequate instrumentation is provided for demonstrating the guaranteed performance of the packaged equipment.
- Ensure that all instrumentation within his scope is suitable for the service conditions.

In order to achieve standardization with the project instrumentation, OGDCL reserves the right, if necessary to;

- Prescribe or proscribe the use of particular makes, models and types of instrumentation.
- Free issue specific parts of the proposed instrumentation for installation by the Vendor.
- Prescribe the use of standardized instrument process connections.
- Suggest changes to the proposed instrumentation and control systems.

Note: *Changes shall only be made with full co-operation and agreement of the Vendor who shall remain fully responsible for the satisfactory operation of the package.*

All information, manuals, certificates, data, and inscriptions shall be in the English language.

1.3 Deviation

All deviations from the technical requirements of this document or any of the listed Codes, Standards, Regulations, Guidance Notes, etc. shall be as stated in the Supplier's proposal and subsequent correspondence.

On acceptance of the order, it is understood that all listed requirements are accepted, without exception. Any cost for engineering and materials subsequently identified shall be wholly borne by the Supplier and the changes incorporated without slippage to schedule or delivery and without further charge to the company.

2.0 REFERENCE DOCUMENTS

2.1 Design Codes and Design Standards

Pakistan Codes and Standards as covered by Pakistan Standards and Quality Control Authority (PSQCA) shall be used where applicable.

Where there is no applicable Pakistan Code or Standard, codes or standards published by the following organizations will be used:

- American Gas Association (AGA)
- International Standards Organization (ISO)
- American National Standards Institute (ANSI)
- American Petroleum Institute (API)
- American Society of Mechanical Engineers (ASME)
- American Society of Material Testing (ASTM)
- British Standards (BS)
- Institute of Electrical & Electronic Engineers (IEEE)
- Instrument Society of America (ISA)
- International Electro technical Commission (IEC)
- International Standard Organisation (ISO)
- International Telecommunications Union (ITU)
- National Fire Protection Association (NFPA)
- National Association of Corrosion Engineers (NACE)
- Scientific Apparatus Manufacturers Association (SAMA)

3.0 SERVICE CONDITIONS

3.1 Environmental Conditions

Care should be taken during the selection of the instrument, so that the selected item can withstand the effects of moderate ambient temperatures coupled with high humidity.

- Ambient Temperature Range 0-60 °C / 32-131 °F
- Relative Humidity 20-65 %
- Maximum Rainfall (Annual) 175 mm
- Wind Velocity 10 - 100 Km/hr
- Earth Quake Zone Zone2A of uniform building code 1997

3.2 Design Life

The equipment and accessories shall be suitable for a minimum period of 15 years continuous operation. Bidders to provide written confirmation in their technical bids.

3.3 Utility design criteria

3.3.1 Electrical Supplies

An electrical supply of 24V DC will be available from the solar power pack at site.

3.3.2 Pneumatic Supplies

Pneumatic supply at site shall be raw gas from instrument gas scrubber at normal pressure 100~150 psig.

4.0 SCOPE OF WORK

Scope of work for Supplier shall include design, fabrication, supply, testing and shipment of pneumatic hydraulic well head control panels and associated equipment. The scope of supply / work / services shall include:-

- Design, fabrication, construction & supply of Wellhead Control Panel in accordance with all technical specifications mentioned in this document.
- Supply of Fusible plugs (as loose shipped items).
- Supply of Pneumatic ESD station (as loose shipped items).
- Supply of Instrument Tubing / fittings within WHCP and outside for instrument connections.
- Supply of High Low Pilots (as loose shipped item)
- Supply of Spare parts for two year operations.
- Documentation including those related to engineering / design as well as training manual, operation and maintenance manuals.
- FAT
- Third Party Inspection

5.0 FUNCTIONAL DESCRIPTION

The wellhead control panel (WHCP) will be used to operate the Surface Safety Valve (SSV) and Sub Surface Safety Valve (SSSV) via two hydraulic headers;

HP header	**SSSV:**
	Operating pressure (10000 psi)
	Detail at Section 7.1.6
MP header	**SSV:**
	Operating pressure (4000 psi)
	Detail at Section 7.1.6

The WHCP will be designed based on pneumatic-hydraulic system. The sequentially control and shutdown logic of WHCP will be done pneumatically.
The WHCP shall be capable of automatically shutting down the SSSV as well as the SSV in response to various alarm conditions requiring shutdown either through pneumatic logic (fusible plug loop, ESD loop, pressure pilots etc) or through solenoid valves from RTU.

The WHCP logic shall be designed to be failsafe. For instrument supply, regulated raw wellhead gas shall be used from Gas Scrubbers (not in vendor's scope) or air compressors (not in vendor's scope).
Note that the distance between wellhead panel and the Xmas tree is nearly 50 meters.
It shall also contain means of overriding low pressure and testing of the high and low-pressure pilots during operation.

5.1 Vital Components of WHCP

Wellhead Control panel shall be furnished with the following vital components:-

1. Pneumatic driven Hydraulic pump for SSV, Supplier to design the pumps as per max ratings provided in section 7.1.6. Discharge hydraulic pressure shall be adjustable with panel mounted pneumatic supply regulator.
2. Pneumatic driven Hydraulic pump for SSSV, Supplier to design the pumps as per max ratings provided in section 7.1.6. Discharge hydraulic pressure shall be adjustable with panel mounted pneumatic supply regulator.
3. Manual Hydraulic pump of 10,000 psi rating.
4. Scrubber/filtration assembly for panel supply.
5. Adequate sized hydraulic oil filters with built-in differential pressure gauges and Y-type strainers for hydraulic output lines from reservoir tank to pumps.
6. Flow control valve.
7. Adequately sized delay time volume bottle for pneumatic supply to the pilot operated 3 way valve.
8. Panel mounted First Out Indicators for providing status of ESD station loop, Fusible plug loop and Hi-Lo Pilots loop.
9. Panel mounted pressure gauges for monitoring of all the critical pressures in the

pneumatic and hydraulic loops.

10. Hydraulic/ pneumatic pilot operated interface 3-way valves with manual bypass option. Hydraulic oil release by these valves will return to the reservoir through return lines.
11. Hydraulic pressure relief valve on SSV & SSSV lines. Adjustable pressure range.
12. Pneumatic pressure relief valve. Adjustable pressure range.
13. Pneumatic pressure regulators.
14. Ball valves, Needle and check valves.
15. The hydraulic relief system should be configured so that it relieves the system pressure into the hydraulic oil chamber/tank.
16. Pilot Operated pneumatic valves.
17. Pressure switches on ESD loop, Fusible plug loop and Hi-Lo pilots loop for remote monitoring of Loop status.
18. Hydraulic Accumulators on both hydraulic lines of SSV and SSSV.
19. Pull/push control knobs: to open /close SSV and SSSV.
20. Push to charge valve: to charge ESD loop, fusible plug loops.
21. 45 Litre Reservoir/ Hydraulic Oil Tank/chamber with breather and level gauge.
22. Expl. proof Level switch for the low level status indicator of hydraulic reservoir.
23. Provision for remote shut-down (through RTU) for SSV shutdown & SSSV shutdown through solenoid valves.
24. Remote Opening of SSV against SSV shutdown only.
25. Pressure transmitters on SSV & SSSV lines

5.2 Controls/Indicators

All operated interface controls shall be on the front of panel. The following control functions and indications on the front of the WHCP shall be provided (as minimum).

- Push button (s) to charge the ESD station & fusible loop.
- Knob to be pulled/ pushed to open/ close both SSV & SSSV.
- Knob to be pulled/ pushed to open/ close SSV.
- Pressure gauges for pneumatic system (gas supply header, regulated pressure, ESD station/fusible plug holding pressure & Hi-Lo Pilot Loop etc)
- Pressure gauges for hydraulic system
- First out Status Indicators (Detail at Section 8.3)
- Reservoir level Indicator (Glass type).
- Pneumatic Pressure Regulators/controllers for adjusting output pressures of Pneumatic driven hydraulic pumps to SSSV & SSV (Detail at section 8.10).

Note: i. *Knobs shall be mushroom head. Raised guards shall be provided to prevent the accidental operation. Knob colors are described in section 6.5. The controls and indicators shall be labeled and color coded in a clear and consistent manner.*

ii. *Pilot operated pneumatic valve/ relays with manual actuation facility (Knobs) shall be used to open the SSSV and SSV valves or to activate the fusible loop or ESD function. These pneumatic relays shall be locked in the open position by use of lock open device. The lock open function will automatically disengage as soon as the pilot instrument pressure gets activated.*

5.3 Critical Features of WHCP

1. Manual / Adjustable time delay for Well closing sequence.
2. Sequential valve opening and closing for both valves i.e. SSSV and SSV.
3. Manual bypass for abnormal process inputs.
4. Essential shutdown options:-
   a. Remote shutdowns (ESD) (by de-energizing 24V DC solenoid valves via RTU). Two options of ESD (Emergency Shutdown) must be in place for shutdown of either SSV only or complete shutdown of both SSV & SSSV.
   b. Fusible plug loop (Low pressure).
   c. High / low pressure relative to the pilot settings.
   d. Manual ESD button at panel.
   e. Manual ESD station, near escape gate.

5.4 Opening of SSSV Valve

The well is equipped with a down-hole Sub-Surface Safety Valve (SSSV).

A control line from the valve will be connected to a bulkhead at the wellhead panel.

Opening of the SSSV shall be by regulating the hydraulic pressure from pump 2 to the actuator of SSSV.

Sequence of the well opening:-

1. SSSV will open first.
2. Then SSV will open after some delay.

5.5 Opening of SSV Valve

In case of opening of SSV, it should only be opened after opening of SSSV & after certain time delay, this time delay should be adjustable

Opening of the SSV shall be by regulating the hydraulic pressure from pump 1 to the SSV actuator.

5.6 Automatic Shutdown

Following means shall be incorporated to achieve automatic shutdown.

i) By means of Block and Bleed HI-LO Pressure Pilots.

ii) By means of Fusible plugs on detection of fire on wellhead.

5.7 Manual Shutdown

Following means shall be incorporated to achieve manual shutdown.

i) By 'ESD Station' near wellhead area via open/close ball valve.

ii) By remote pushbutton (at CCR) which actuates the solenoid valve i.e. 'electrical ESD' through RTU/PLC (PLC/RTU is not in vendor's scope).

iii) By pushing the red knob of pneumatic relay given on the front of wellhead control panel.

iv) SSV valve shall be operated independently from SSSV valve by switching the pneumatic relay knob given on the wellhead panel front side (pull to open and push to close).

v) SSSV valve shall not be operated independently from the SSV valve, so as to avoid closing of SSSV valve when well is flowing. If SSSV valve is manually closed erroneously, the SSV also closes in sequence.

5.8 Closing Sequence (Time delayed Mode)

Surface safety valve (SSV) and the subsurface safety valve (SSSV) will closes in the following sequence.

i) SSV valve closes without any time delay.

ii) SSSV valve closes 20-30 seconds later after SSV valve

Time delay circuits consisting of flow control devices, volume bottles/timing device and 3-way valve shall be provided to fulfill the requirements.

Seq.	Shutdown Source	SSV	SCSSV
1	Fire at Wellhead (Fusible Plug Loop) Automatic shutdown	First close	Last close
2	High Pressure at flow-line. (High Pilot) Automatic shutdown	First close	Not Closed
3	Low Pressure at flow-line. (Low pilot) Automatic shutdown	First close	Not Closed
4	Manual turn to open ESD station	First close	Last close
5	Manual push to close SSV of WHCP	close	Not Closed
6	Manual push to close SSSV of WHCP	First close	Last close
7	Remote close SSV of WHCP by de-energizing 24 V DC solenoid valves via RTU	close	Not Closed
8	Remote close SSSV of WHCP by de-energizing 24 V DC solenoid valves via RTU	First close	Last close

5.9 Startup Over-ride

A start-up bypass shall be installed to override the low pressure shutdown signals from flow-line. The bypass will automatically reset when preset process pressure is reached.

5.10 Closing of SSSV and SSV remotely

The logic shall be so arranged that either SSV or both SSSV and SSV can be remotely closed through solenoid valves S1 and S2.

5.11 Opening of SSV remotely

a. If shut-downed SSV remotely through energizing of solenoid valve S1.

The logic shall be so arranged that SSV can be remotely opened through utilization of solenoid valve S3 to provide air pressure to the POV3 valve & energize the SRV2. However S1 valve will initially be reset remotely in this scenario.

However if suitable solution is not provided, then OGDCL reserves the right to remove this logic / feature at any time.

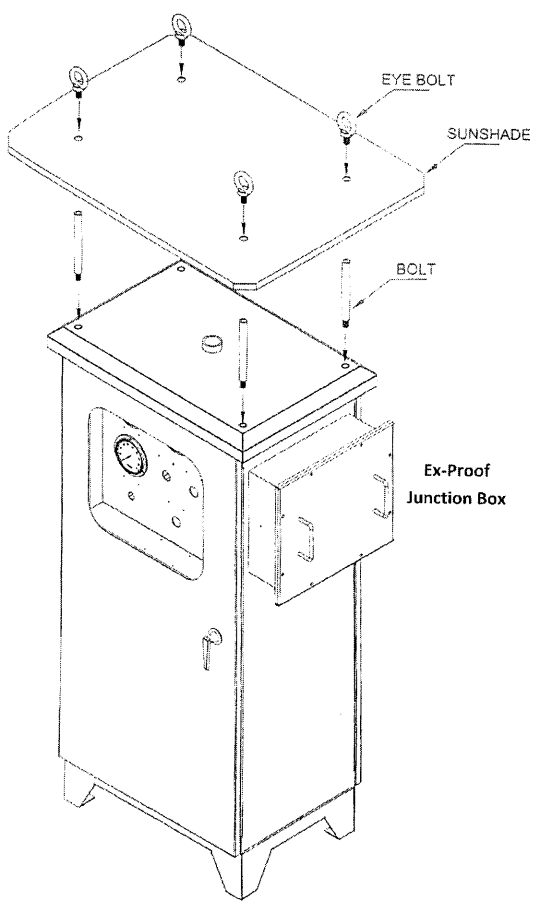
6.0 DESIGN AND CONSTRUCTION

6.1 Panel Construction

The skid mounted WHCP shall be made of stainless steel and painted to finished coat. Panel shall be suitable for zone 2 hazardous area installation with:

i. Framework
ii. Roof with sunshade
iii. Bottom plate and plinth
iv. Front & Back doors

The skid shall be designed with consideration to wind, loading, transportation and panel sizing. The structure shall be designed with dimensions large enough to contain all equipment, instrumentation and piping, including adequate space for operational and maintenance access.



General Material of Construction	Minimum 12 gauge or 3mm 316 stainless steel materials Welding shall be continuous and spot welding shall not be acceptable.
Degree of Protection	At least IP-54 to IEC 529
Sun Protection	Sun shields shall be provided for optimal shade from the sun during the hottest periods of the day.
Panel Certifications	NEMA IEC Ex FM APPROVED UL NACE INTERNATIONAL

Panel shall be lockable by key-lock. Skid to be lifted shall be supplied with four pad eyes adequately designed and properly spaced to ensure a safe lift without causing any distortion in panel. Where a spreader bar or spreader frame is required, the Vendor shall include, its fabrication and supply in their design and scope of work, including any required shackles and slings.

A drainable drip tray must be provided under the non-slip grating floor. The drainable display shall be sized to hold the contents of the reservoir.

Please note that H2S & CO2 may increase upto 13% and 15% with some water contents in the instrument gas supply.

6.2 Component Identification

All components and equipment inside the panel shall be clearly identified with a three-ply white/black/white laminated plastic label displaying tag number, service and working pressure. All labels on the outside of the panel shall be stainless steel. The hydraulic bulkhead fittings shall be identified with a field tag number.

Different working pressures shall be clearly identified at entry and exit points.
Following knobs colors shall be preferred.

- Open/Start Green
- Close/Stop Red
- ESD Red
- ESD Reset Black

6.3 Air Filtration for Panel Supply

Air Filter with 25 µm filter element and auto drain facility for panel supply shall be installed. Material shall be SS 316 (Body & bowl) and NACE compliant. It will ensure removal of liquid and solid particles. Bowl capacity shall be minimum 8 fluid ounce (0.24 liter).

Service life indicator turns from green to red when the filter element needs to be replaced.
Other details & quantity are mentioned in the BOM under section 11.0.

6.4 Internal Tubing and Compression Fittings

a) Internal Tubing

All tubing shall be according to ASTM A269, 316SS seamless. Tubing must be suitable for the operating pressures & temperatures required by the specifications. All tubing inside of the panel should be 3/8" size.

b) Instrument Tubing Fittings

Tube fittings shall be twin ferrule compression type 316 stainless steel Parker 'A'lok, Swagelok or HOKE Gyrolock (or equivalent) and shall be installed in accordance with manufacturer's instructions.

7.0 HYDRAULIC CONTROL SYSTEMS

7.1 Hydraulic Power Units (HPUs)

Hydraulic Power Units are required for the Wellhead Control Panels. The Hydraulic Power Units shall be designed with the general considerations as outlined below.

7.1.1 Minimization of Contamination

Contamination of the hydraulic system shall be minimized by giving consideration to the following:-

- Components shall be selected which can be easily cleaned and do not generate contaminants.
- Filtration provision shall be adequate and shall be situated to give the most effective protection, drain points or means of flushing oil circulation shall be provided through dead sections.
- Sampling connections shall be fitted at required points around the system. Hydraulic reservoir shall be filled via filtration units.
- Packing shall be of a non-fibrous material. Cold couplings shall be used.

Sample points shall be provided for regular monitoring of contamination levels and system draining. Sampling procedures shall be provided by the Vendor. Sample points shall take the form of a capped isolation ball valve installed at suitable points around the complete Hydraulic System.

Consideration shall be given to possible contamination caused by dust or river side sand.

7.1.2 Materials and Coatings

Care shall be taken in the selection of materials used within the Hydraulic Control System to minimize corrosion effects induced by process conditions, environmental conditions and combinations of dissimilar metals.

All items on the Hydraulic Control System that are exposed to the environment shall be of a non-corroding material. Where aluminum is proposed, the Vendor shall submit to the Purchaser for approval of protective finishes that provide long term corrosion prevention. This shall include all threaded parts, packing glands and materials required for the mounting of accessories.

- Cadmium plating or galvanizing shall not be used for any component.

7.1.3 Hydraulic Fluid

Vendor shall specify hydraulic fluid suitable for the application.

7.1.4 Reservoir Tank

The reservoir tank shall be fabricated from type 316L stainless steel to reduce the risk of fluid contamination. The reservoir shall be designed to prevent any build-up on the bottom and shall include a large access cover to facilitate cleaning and inspection.

Reservoir volume capacity = 45 Litre

Level gauge shall be provided with markings indicating:

- Max fill level (system de-pressurized)
- Low level alarm point

All required instrumentation shall be adequately provided with isolation valves and drains to allow removal without draining the reservoir.

The reservoir shall be adequately vented to allow unrestricted level variation due to accumulator and actuator volume changes.

The breathers shall have a flow rating large enough to prevent pressure rise in the reservoir during an ESD and have adequate micron rating to prevent the ingress of contaminants from the environment.

The reservoir return lines shall be long enough to extend to below the reservoir fluid to prevent foaming. The return lines installation shall be provided with an anti-siphon hole to prevent the reservoir draining through siphon action when the return lines are disconnected at either the skid limit or at the wellhead actuators.

All reservoir drain and fill lines shall be piped to the limit of the skid and be clearly identified. All fill lines shall have strainers fitted to prevent contamination.

Level switch shall be installed for the level status of hydraulic reservoir.

a. Hydraulic tank consist of:

Reservoirs	**Supply**	**Return**
Reservoir Total Volume	45 litres	Baffle
Level Switch	Yes	No
Level Gauge	Yes	No
Outlet point	Yes	No
Return point	No	Yes
Drain Valve	Yes	No
Flame Arrestor	Yes	No
Air Breather	Yes	No

7.1.5 Directional Control Valves

Two Directional High Pressure Control Valves (POV 1 and POV 2) shall be installed on both hydraulic lines to SSV and SSSV. These valves will be air pilot operated. These valves shall be configured in the following manner:-

1. On supplying air supply, these high pressure direction control valves will pass the hydraulic oil from respective pumps to SSV and SSSV.
2. On air-supply cut-off, these high pressure direction control valves will return the hydraulic oil released by SSV and SSSV to the reservoir tank through return lines. Vendor can also quote quick exhaust valves for the return of hydraulic oil released by SSV and SSSV to the reservoir tank through return lines.

Type	High Pressure Directional Control Valve, 3 port 2 position, Normally closed
Wetted Parts	SS Material
Input Pilot Pressure	Pneumatic Air Supply (10 bar)
Hydraulic Input/output pressure	690 bar
Certification	NACE

Bidder can provide similar solution but OGDCL reserves the right to accept or reject the solution without assigning any reasons.

7.1.6 Pneumatic Driven Hydraulic Pumps & Hydraulic Hand Pump

Wellhead Control Panel shall have following pumps:-

1. Pneumatic driven Hydraulic Pump for SSV
2. Pneumatic driven Hydraulic Pump for SSSV
3. Manual Hydraulic Hand pump

Two pneumatic driven (gas powered) hydraulic pumps shall be NACE compliant. Panel mounted air regulators will control the pump discharges at the desired operating pressures. The capacity of the pumps shall enable the whole system to be fully charged within minimum time, when re-commissioning following a shutdown.

A manual hydraulic hand pump shall be connected to the hydraulic systems for test purposes, priming and system purging. In case of malfunction or maintenance of any pneumatic driven hydraulic pump, this manual hydraulic pump will be used to maintain the desired hydraulic pressure to SSV or SSSV.

Pressure Rating of Hydraulic Pump for SSSV = 10,000 psi

Hydraulic Pump for SSV = 4,000 psi

Discharge pressures shall be in adjustable range in accordance with the SSV & SSSV Pressures. Data sheet of pneumatic driven hydraulic pumps is as follows:-

Type	Pneumatic Driven hydraulic Pump
Wetted Parts	SS Material
Input	Pneumatic Air Supply
Output	Hydraulic Oil
Certification	ATEX & NACE

Manual Hydraulic Hand Pump

Data sheet of manual hand pump is as follows:-

Type	Hydraulic through hand pump
Pressure Rating	10,000 psi
Piston diameter	1/2 inch
Volume per stroke	0.29 Cu. Inch
Handle Lever Load Per 100 psi	1.23 Lbs
Output	Hydraulic Oil

7.1.7 Separate Hydraulic Lines to SSV and SSSV

Separate hydraulic output lines from Pneumatic driven Hydraulic pumps for SSV and SSSV is mandatory.

7.1.8 Hydraulic Accumulators

Two Hydraulic accumulators in the SSV and SSSV loops will compensate changed system pressure that made by micro leakage and expands with heat and contracts with cold. At the same time, they can reduce impact influence that caused by hydraulic pump operation and reduce the start-up of hydraulic pumps. Other details & quantity are mentioned in the BOM under section 11.0.

7.1.9 Hydraulic Oil Filters and Suction Strainers

Hydraulic Oil Filters with built-in differential pressure gauges shall be installed at the Hydraulic output lines coming from Hydraulic reservoir tank before each pump. To facilitate on-line maintenance, the filter shall be capable of being isolated and replaced without shutting down the complete system.

The filter shall be manufactured in stainless steel.

03 hydraulic oil filters shall be required for the hydraulic filtration process & monitoring. Complete details (Make, Model, Part number with supporting literature) shall be provided in the technical bid.

Suction Strainers

Suction strainers (Y type, SS-316) shall be line mounted before Hydraulic oil filters at the Hydraulic output lines coming from Hydraulic reservoir tank, and each shall be capable of being isolated and drained without shutting down the complete system.

03 Y-type suction strainers shall be required before each pump for the hydraulic filtration process.

8.0 OTHER VITAL COMPONENTS

8.1 Control Valves

These valves can be actuated by a pilot signal or manually by pulling the knob when there is no pilot signal. 3 way or 4-way type can be used for creating the required logic of functionality. Other details & quantity are mentioned in the BOM under section 11.0.

8.2 Isolation and Non-return Valves

a) Isolation Valves

All equipment installed on headers operating at pressures greater than 290 psig shall be installed as follows (Must be shown on P&ID):-

- Instrument & Pressure Gauges — **Double block and bleed valves**
- All other Serviceable Items — **Double isolation valves**

b) Common Mode Failure

The failure of any common component shall not cause the failure of any other hydraulic circuit. Examples of such items include, but are not limited to the following:

- Filters
- Regulators
- Non-return valves

8.3 Panel Indications (First Out)

'First Out' status indications on any shutdown condition shall be provided locally on main control panel to guide the operator to know the reason of the shutdown. Specifications are as follows:-

Construction:	Body : 316 stainless steel, Seals: FKM (Fluorocarbon), Lens: Poly carbonate (sealed to prevent moisture intrusion) NACE Compliant
Actuation	Pilot
Function:	Status Indicator
Service:	Pneumatic to a maximum 200 psi (13.8 bar)
Indicators:	Red/Green
Mounting:	Panel mount

Indicator displays a green field when a minimum of 8 psi to a max of 200 psi is present. Complete loss of pressure causes the indicator to display a red field, marked with recognition character "R". Minimum of Fusible Loop, ESD Loop, Flow-line Pre Low & Flow-line Pre High Indicators must be available on the front panel. Other details & quantity are mentioned in the BOM under section 11.0.

8.4 Solenoid Valve

EEx'd' type, 3-way Solenoid valve with terminal box should be used. Body should be suitable for Zone 1 and gas group IIA and temperature class T3. Solenoid vent should be extended vertically up to a safe distance. Solenoid valves shall operate at 24 VDC supply and shall be low power type. For Remote shutdown, solenoid valve shall be utilized. Data sheet is as follows:-

Type	Explosion Proof 3-way solenoid valve
Material	Suitable for Zone 1 & Group IIA
Power Supply	24 VDC

Other details & quantity are mentioned in the BOM under section 11.0.

8.5 Bleed and Drain Connections

Bleed connections shall be installed at the highest points within the panel to ensure that all entrained air can be vented. A drain connection shall be installed at the lowest point within the panel. Vents and drains shall have valve and plug.

8.6 Ball Valves

All ball valves to ensure quick action and a positive leak proof shut-off. The complete valve construction shall be 316 stainless steel. All valves getting pneumatic supply must be NACE compliant. Other details & quantity are mentioned in the BOM under section 11.0.

8.7 Pressure Gauges

Indicating pressure gauges shall be of heavy duty, liquid filled and precision type. All gauges shall be equipped with a blow-out seal (at 1.5 x psig). They shall be so installed that mounting arrangements do not prevent the functioning of these blow-out devices.

Cubicles mounted gauges shall have 2-1/2" dials minimum. Dials shall be white with black numerals.

The blowout features described above are required. Material for bourdon tubes shall be suitable for wet sour gas services. Pressure gauges for pulsating services shall have a helical gearless type movement with micro range adjustment and dampener.

Dial Size	2-1/2 inch with shatterproof glass
Pressure Range	Varies depending on pressure loop.
Material	316 Stainless steel wetted parts & 304 stainless steel case and bayonet ring. All gauges on pneumatic lines must be NACE Compliant.
Process Connection:	Gauges mounted on the panel front shall have back connections.
Liquid Filled	Yes
Accuracy	$\pm$ 1% of span

Bidder to provide complete details of pressure gauges with make, model, part number, specifications & supporting literature in the technical bid.

8.8 Pressure Relief Valve

Pressure relief valves shall be installed & configured in accessible locations to relieve excess pressure in the hydraulic lines into the hydraulic oil tank. To allow a controlled build-up of pressure for normal opening of the sub-surface safety valve and the surface safety valve, manually adjusted pressure regulators and pressure gauges shall be installed in the hydraulic supply lines to the SSSV and SSV. Valve construction shall be 316 stainless steel & NACE compliant. Other details & quantity are mentioned in the BOM under section 11.0.

8.9 Check Valves

Check valves shall be installed in the hydraulic/pneumatic logic supply lines to control the leakage of hydraulic fluid/pneumatic signal in the event of a pilot line break. The complete valve construction shall be 316 stainless steel. All valves on the instrument lines shall be NACE compliant. Other details & quantity are mentioned in the BOM under section 11.0.

8.10 Panel Mounted Pressure Regulators

Four Panel mounted pneumatic pressure regulators with control knob shall be installed on the front panel to control the input air supply of Pneumatic driven hydraulic pumps for a desired output pressures to SSSV and SSV, One for the main supply and one for the complete pneumatic loops. Body material & range spring shall be SS-316. Pressure range shall be upto 200 psi. These shall be NACE compliant.

8.11 Explosion proof Junction Box

Explosion proof junction box (SS-316) shall be installed on the side of WHCP for the connections of switches & transmitters. It shall be Suitable for operation in Class I, II Division 2. Cable entries, cable gland types & other accessories will be vendor recommended according to the zone classifications. Degree of protection shall be IP65+. Quantity is mention in BOM under section 11.0.

9.0 Loose Items

9.1 Fusible Plugs

The wellhead shall have dual fusible plugs, strategically located in parallel, to form a common control pressure line. Fusible Plugs act as fire sensors and sensing of a fire will melt the fusible plug. Venting of the control pressure shall shut the well. Quantity is mention in BOM under section 11.0. Specs are as under:-

Construction	AISI 316 SS
Maximum Ambient Temp.	60 Deg C
Maximum thread size	1/4" NPT
Body Material	316 SS
Maximum Pressure	300 psi Adjustable
Melting Point	90 deg C

9.2 High Low Pilots

The SSSV and SSV shall be controlled by a block and bleed HI-LO pilots. The two pilots shall be mounted on a manifold block, to sense a common pressure (pipeline pressure). One is set to monitor low pressure & other high pressure. Under normal conditions these pilot valves shall direct the control pressure to the interface valve to allow passage of hydraulic power to the valve actuators, thus causing it to open. If either a high or low limit is reached, the respective pilot blocks the inlet side and bleeds the control pressure, thus allowing the hydraulic fluid pressure to relieve to the return header; results in loss of both valve actuator pressures thus provide a failsafe shutdown of the system. On loss of hydraulic pump pneumatic supply or on loss of the hydraulic supply line pressure to the actuators, the valves shall move to the close position. Some specifications are as under:-

Construction	316 SS with NACE Compliant
Temperature Range	- 20 to + 250 deg. F
Design Pressure (manifold assembly)	5,000 psi
Operating Pressure Range	200 - 2500 psi
Pressure Range of Lo Pilot	100 – 1000 psi Adjustable
Pressure Range of Hi Pilot	1500 – 3000 psi Adjustable
Set Point Repeatability	± 1% of Set pressure

Quantity is mentioned in BOM under section 11.0.

9.3 Instrument Fitting

Tube fittings shall be twin ferrule compression type 316 stainless steel Parker 'A'lok, Swagelok or HOKE Gyrolock (or equivalent) and shall be installed in accordance with manufacturer's instructions. All instrument tubing & fittings inside/on the panel are in the vendor's scope of supply.

Supplier shall also provide instrument fittings as loose for external use between WHCP and SSSV/SSV/ESD/Hi-Lo Pilot etc.

Quantity is mentioned in BOM under section 11.0.

9.4 External Instrument Tubing

All external tubing shall be according to ASTM A269, 316SS seamless. Tubing must be suitable for the operating pressures & temperatures required by the specifications.

Vendor shall provide loose tubing (1/4" x 0.065 wall thickness Tubing 316SS) for each wellhead control panel for connection between WHCP, SSV/SSSV/ESD (Qty mentioned in BOM under section 11.0.

9.5 Spare Parts for 02 year Operation

Vendor shall provide & quote spares [5 sets of seals for pneumatic driven hydraulic pump for SSSV, 5 sets of seals for pneumatic driven hydraulic pump for SSV, 5 sets of seals for hydraulic hand pump, 20 pcs of oil filters, 01 Panel mounted pressure gauge for SSSV, 1 Panel mounted pressure gauge for SSV] against each WHCP, required for two years of operation.

All spare parts furnished by the vendor shall be wrapped and packaged so that they will be preserved in original in new condition under normal storage conditions for a min 03 years and shall be properly tagged and coded so that later identifications as to intended equipment usage will be facilitated. They shall be packed separately clearly marked as 'spare parts' and shipped along with the other equipments.

Bidder shall provide itemized prices of all spares in its financial bid with make, model, part number & specifications. Cost of Spares shall not be the part of financial evaluation; however OGDCL will reserve the right to drop all spares without assigning any reasons.

10.0 PAINTING AND PREPARATION FOR SHIPMENT

10.1 PAINTING

Supplier standard procedure in accordance with the relevant industry standards for suitable protection and paint shall be followed.

10.2 PREPARATION FOR SHIPMENT

The Supplier and any sub-Supplier shall comply with standard procedures for preservation and packaging and will dispatch with proper marking and documentation.

The Supplier shall take all precautions deemed necessary for protection during shipment and additionally during storage in a marine environment including the following:

a. A desiccant shall be provided inside all enclosures to prevent damage by high humidity.

b. The Supplier shall supply a recommended procedure for long-term storage (up to 36 months).

c. Equipment shall be suitably packed in a wooden crate such that damage during shipment due to distortion can be avoided.

d. Each individual carton or box shall be marked with the instrument tag No. on the top and side of the carton.

e. All ports and openings shall be sealed. Threaded connections shall be protected with metallic caps or plugs.

f. Line connections shall be covered with wooden, plastic or metal friction plugs, caps or flanges to exclude foreign material from the interior of the valve and to fully protect the faces of the flanged valves from damage during shipping.

g. Machine surfaces which may be exposed to the atmosphere in transit and subsequent storage shall be protected with an easily removable rust preventative coating applied by the manufacturer, but not until inspection, if required, has been completed.

Handling of the equipments shall be carried out with best industrial practices, to avoid damage due to rough handling.

11.0 BILL OF MATERIAL FOR WHCP

Details of following minimum BOM is as under:-

S.No.	Item	Unit	Qty
1	Details of following minimum inside BOM for each WHCP is as under:-	No.	15
	Wellhead Control Panel with all requisite minimum of following internal accessories:- 1. Pneumatic driven hydraulic pump for SSSV, NACE compliant, Hydraulic O/P Pressure mentioned in section 7.1.6, **Qty: 01** 2. Pneumatic driven hydraulic pump for SSV, NACE compliant, Hydraulic O/P Pressure mentioned in section 7.1.6, **Qty: 01** 3. Manual Hydraulic pump, Pressure 10,000 psi, **Qty: 01** 4. Static Pressure gauges for pneumatic system, 2-1/2 inch dial size, Panel mounted, Liquid filled, 1% Accuracy, SS316, Pressure: 250/300 psi, NACE compliant, **Qty (010)** [Distribution:- Main Supply, Supply pressure of Pump 1 (01), Supply pressure of Pump 2 (01), Complete ESD Loop (01), ESD Station loop (01), Fusible plug loop (01), Hi-Lo Pilots In and Out (02), Supply pressure to Pilot Operated valve POV1 (01), Supply pressure to Pilot Operated valve POV2 (01)]. 5. Static Pressure gauges for hydraulic line system on SSV & SSSV line (H1, H2), 2-1/2 inch dial size, Panel mounted, Liquid filled, 1% Accuracy, SS316, Pressure: 6,000 psi, **Qty (02)** – [Distribution:- Immediate Outlet of Pneumatic driven Hydraulic Pump 1 (Qty: 01), Immediate Outlet of Pilot Operated valve on hydraulic line to SSV Qty (01)] 6. Static Pressure gauges for hydraulic line system on SSSV line (H3, H4), 2-1/2 inch dial size, Panel mounted, Liquid filled, 1% Accuracy, SS316, Pressure: 10,000 psi, **Qty (02)** – [Distribution:- Immediate Outlet of Pneumatic driven Hydraulic Pump 2 (Qty: 01), Immediate Outlet of Pilot Operated valve on hydraulic line to SSSV Qty (01)] 7. Hydraulic Oil Filter with built-in Differential pressure gauge, **Qty: 03** 8. Instrument Air filter with automatic drain, 316SS, Nominal bowl size: 8 fluid ounce (0.24 liter), 25 µm filtration, NACE compliant, **Qty: 01** 9. Instrument Air Pressure Regulator (PR1, PR2, PR3, PR4), Panel mounted, SS316, NACE compliant, Supply Max: 250 psi, Output: 0-150 psi, Adjusting knob has snap action lock, **Qty: 04** 10. Y-type Stainless Steel Suction Strainer with end cap plug, **Qty: 03**		

	11. Double block & bleed valves for pneumatic gauges, SS316, Pressure rating: 500 psi, **Qty 01** 12. Double block & bleed valves for Hydraulic gauges on SSV line, SS316, Pressure: 8,000 psi, **Qty 02** 13. Double block & bleed valves for Hydraulic gauges on SSSV line & manual pump line, SS316, Pressure: 10,000 psi, **Qty 02** 14. Solenoid valve (S3), 24 VDC, Normally closed, NACE, If energized, cut-off the air supply, **Qty 01** 15. Solenoid valve, 24 VDC, Normally Open, NACE, If energized, pass the air supply, **Qty 02** 16. Check valve for pneumatic loops (C1), min. 500 psi, SS316, NACE compliant, **Qty: 03** 17. Check valve for hydraulic loops after pump (C2), SS-316, pressure rating: vendor recommended according to max pressure of respective pumps, **Qty: 03** 18. Check valve for hydraulic loops before pump (C3), SS-316, pressure rating: vendor recommended according to max pressure of respective pumps, **Qty: 03** 19. Ball valve in pneumatic loops (B1), 2-way, SS-316, 500 psi, NACE, **Qty: 25** 20. Ball valve at reservoir tank on return input line (B2), Pressure: according to the loop pressures from SSSV/SSV, SS-316, **Qty: 01** 21. Ball valve on SSV, SSSV hydraulic loops after pumps (B3), 12,000 psi, **Qty: 06** 22. Ball valve before hydraulic pumps & on reservoir tank, pressure: according to the loop pressures (output loops), SS-316, **Qty: 15** 23. Needle valve on pneumatic loops (N1), NACE, 500 psi, **Qty: 07** 24. Needle valve on SSV line (N2), 6,000 psi, **Qty: 02** 25. Needle valve on SSSV line (N3), 12,000 psi, **Qty: 02** 26. Internal S/S-316 Instrument Tubing with connectors, **Qty: 1 Lot** 27. Reservoir tank 45 L, SS-316 material, with S/S breather, Fill cap and Stainless steel level gauge, **Qty: 01** 28. Level switch for reservoir tank, side-mounted float type, Stainless steel sensor, explosion proof, **Qty: 01** 29. Pilot/Manual Operated spring return valve, 300 psi, NACE, (SRV1 & SRV2), Knob color: One Red & One black, **Qty: 02** 30. Pilot Operated Directional Control valve, 3 port 2 position, 300 psi, NACE, (POV3, POV4, POV5, POV6, POV7) **Qty 05** 31. Pilot operated High Pressure Directional Control valve for SSV line (POV1), with manual bypass, Pilot supply 10 bar, 10,000 psi hydraulic input/output pressure, 3 port 2 position, normally closed. **Qty: 01**		

	32. Pilot operated High Pressure Directional Control valve for SSSV line (POV2), with manual bypass, Pilot supply 10 bar, 15,000 psi hydraulic input/output pressure, 3 port 2 position, normally closed. **Qty: 01** 33. Flow Control Valve on pneumatic line for SSSV closure delay, SS316, Max working pressure: 150 psi, Set @ 30 seconds, **Qty: 01** 34. Air Reservoir Volume bottle, 0.3+Litre capacity, 200 psi, SS316, **Qty: 01** 35. Pneumatic relief valve, NACE, Adjustable, 50-300 psi, **Qty 01** 36. Hydraulic relief valve, Adjustable setting according to output pressure rating of pumps in their respective loop, vendor recommended, **Qty 02** 37. Hydraulic Accumulator for SSV line, pressure rating: 10,000 psi, capacity: 316 Stainless steel body, other details: vendor recommended, **Qty 01** 38. Hydraulic Accumulator for SSSV line, pressure rating: 15,000 psi, 316 Stainless steel body, other details: vendor recommended, **Qty 01** 39. First Out Loop Status Indicator, Red/Green, Body: SS316, Panel mount, NACE compliant, Indicator displays a green field when a minimum of 8 psi to a max of 200 psi is present. , Complete loss of pressure causes the indicator to display a red field, **Qty 04** 40. Pressure Transmitter, Explosion proof, Wetted parts SS316, Pressure equivalent to the max output pressure of pneumatic driven hydraulic pumps, 24VDC, Body & wetted parts: 316 stainless steel, IP65+, NEMA 4X enclosure, **Qty: 02** 41. Adjustable Pressure Switch, Explosion proof, IP65+, 316 S/S Body, 316 Stainless steel wetted materials, NACE compliant, pressure range: 25 to 150 psig, **Qty: 03** 42. 2 WAY Manual Push button valve to charge, SS316, NACE, Pressure rating: 230 psi, **Qty 01**		
2	Fusible Plugs, SS316, Melting point 90 deg.C, Max pressure: 300 psi	No.	30
3	Pneumatic ESD Station, SS316, Valve	No.	15
4	High Low Pilots, Two block and bleed HI-LO pilots, 316 SS with NACE Compliant, Design Pressure (manifold assembly): 5000 psi, Operating Pressure Range: 200 - 2500 psi	No.	15
5	Instrument Tubing, SS-316, Size: 1/4", 0.065" wall thickness (Required between WHCP and SSV/SSSV/ESD Station/ Fusible Plugs/ High Low Pilots.)	Meters	3000

6	Instrument Fittings & Valves • 1/4" x 1/4" Male Elbow, SS-316 Qty. 10 • 1/4" x 1/4" Male Connector, SS-316 Qty. 10 • 1/4" Male Run Tee, SS-316 Qty. 05 • 1/4" Union, SS-316 Qty. 10 • 1/4" Front Ferrule, SS-316 Qty. 20 • 1/4" Rear Ferrule, SS-316 Qty. 20 • ½" Ball Valve for connection to Hi-Lo Pilot from Well pipeline, Pressure Rating: 3000 psi, NACE compliant , SS-316 Qty. 01	Set	15
7	Explosion proof Junction Box (placed in S/S box as mentioned in DWG in section 6.1), IP65+, for all electrical connections	No.	15
8	Two Years Operational Spare Parts [5 sets of seals for pneumatic driven hydraulic pump for SSSV, 5 sets of seals for pneumatic driven hydraulic pump for SSV, 5 sets of seals for hydraulic hand pump, 5 pcs of oil filters,]	Set	15

12.0 FUNCTIONAL AND PERFORMANCE TESTS

Functional & performance tests of the WHCP shall be carried out at vendor's facilities with input and output simulation. Maximum period for Functional & performance tests shall not exceed 03 working days.

The complete panel with all equipment installed and connected shall be pressure tested for any leak in the system. The hydraulic lines shall be pressure tested for 24 hours at maximum operating pressure using the specified hydraulic fluid. The pneumatic lines shall be leaked-tested at 220 psig using SNOOP liquid or equal.

The complete system shall be tested in two stages:

i. Assembly level checks in accordance with the vendor's QA/QC plans and procedures.

ii. Functional & performance tests on the completed system.

Functional & performance tests shall include but not be limited to:-

i. Visual inspection.

ii. Hydrostatic tests

iii. Hardware tests

iv. Functional tests.

The offered system shall be visually inspected by two OGDCL officials to ensure that it has been constructed to the specifications and to the approved drawings. However OGDCL will initiate separate case for inspection of Functional & Performance Tests at OGDCL's own cost.

Vendor will submit the detailed report of Functional & Performance Tests to OGDCL before shipment.

13.0 THIRD PARTY INSPECTION (TPI)

OGDCL will initiate separate case for carrying out Third party inspection of Wellhead Control Panels at vendor's site before shipment. The cost of the TPI shall be borne by OGDCL. In this regard, bidder will confirm to cooperate and facilitate for carrying out TPI at vendor's facilities.

14.0 VENDOR DOCUMENTATION REQUIREMENTS

Vendor shall provide 02 sets of each, both soft and hard copies, as under:-

i. Operation and maintenance manuals.
ii. Product catalogs.
iii. Installation Drawings.
iv. Panel Layout Drawings.
v. Inspection and Test Certificates.
vi. P&ID's etc.
vii. Pneumatic-hydraulic-electric schematic drawing. (to be submitted with the bid)
viii. Complete component list along with make and country of origin (to be submitted with the bid).
ix. Dimensional drawings and weight information (to be submitted with the bid). Product catalog including components details (to be submitted with the bid). A soft copy of documentation should also be provided by the Supplier.

15.0 TERMS & CONDITIONS

a) Packager /Manufacturer must have a proven track manufacturing record of Wellhead Control Panels over a minimum period of ten (10) years. Packager /Manufacturer must have also a proven track sale record of over 500 similar wellhead control panels. Bidder is required to submit documentary evidence (purchase orders) in this regard, otherwise bid will be rejected.
b) Packager /Manufacturer shall provide warranties/guarantees regarding the performance of WHCP according to the tender specifications.
c) Packager/ Manufacturer shall be responsible to ensure the delivery of complete material within 04 Months after the establishment of L/C.
d) Packager/Manufacturer shall be responsible to provide Original Testing and Calibration Certificates of the equipment.
e) Packager/Manufacturer shall provide Certificate of Origin.
f) The Packager/ Manufacturer shall ensure that all material being used in the WHCP shall be new and free of defects in any way. For specifications, most stringent clause shall prevail.
g) The Packager/ Manufacturer shall submit complete P&ID of the process in technical bid depicting pumps, instrument & hydraulic lines, Hydraulic reservoir, suction strainers, filters, ball valve, solenoid valves, Pilot operated valves, Relief valve, check valve, pressure gauges, First out status indicators, Hi-Lo Pilots, Fusible plugs, accumulators, Interface valve, pressure regulators, time delay circuit, First out indicators etc.
h) Bidder shall submit complete details of all items with make, model, part number, specifications & supporting literature in the technical bid. Non-provision of desired information may lead to disqualification of the bid.

ANNEXURE-Y

DETAILS OF WELLHEAD CONTROL PANELS SUPPLIED, INSTALLED & COMMISSIONED DURING LAST TEN (10) YEARS

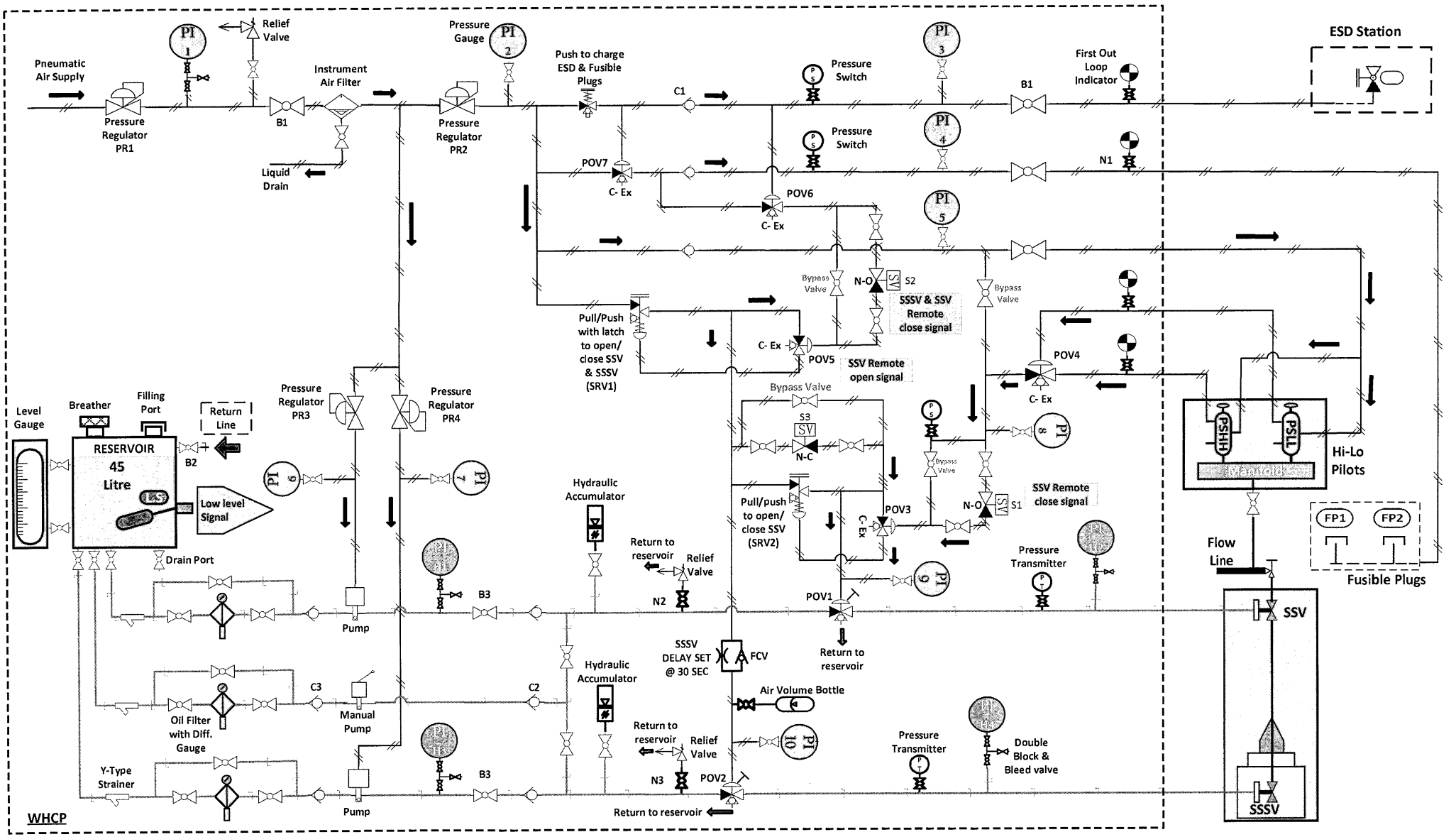
Sr. No.	Name & Address (Including Phone, Fax, email) of Buyer	Country (*)	Details & Description of Supplied Equipment					Details & Description of Scope of Supply & Responsibilities	Details of Installation Assistance and Commissioning
			Qty	Year Of Supply	Contract Value	No. of Panels supplied			

(*) Please list country of origin (home country) orders first followed by Pakistan and other countries.

NOTE:

Please also provide a list of current orders for Supply, Installation & Commissioning of Wellhead Control Panels on the above pattern.

WELLHEAD CONTROL PANEL



Legend

Common Exhaust [C- Ex]

Relief Valve	Flow Control Valve	Level Gauge	Gas Recharge Valve	Loop Indicator	Oil Filter with Diff. Gauge	Ball Valve	Pilot operated Control valve with manual bypass	Instrument Line	Solenoid Valve	Check Valve	Hydraulic Accumulator	Hydraulic Line	Pressure Regulator	Pressure gauge
Double Block & Bleed Valve	Manual hydraulic Pump	Pilot operated Valve	Pilot/ Manual operated Spring return valve	ESD Valve	Solenoid 3 way valve	Air Volume Bottle		Y Type Strainer		Level Switch	Air driven Hydraulic pump	Pressure Transmitter	Air Filter	Needle Valve