UCH COMPRESSION PROJECT

Design Engineering, Procurement (Supply), Construction, Installation/Erection, Pre-Commissioning, Commissioning & Start-up (including performance testing and Reliability Guarantee Test) of Compression System at UCH Compression Project
Tender Enquiry No. PROC-FC/CB/PROJ/UCH(COM)-4462/2019

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Item No.	ITB Reference	ITB Description	Query	Response
1	General	Geo-technical investigation	Geotechnical investigation is not a part of Bidders scope of work. Existing Geo-technical reports shall be provided by COMPANY for Bidders reference and use. Bidder to perform. Company to confirm.	The soil investigation report has already been provided along with PBC 5 and PBC 6 for reference only. However for EPCC responsibility please refer article 6.0 of Section III of Scope of work.
2	General	Topographical and Underground survey	Existing Topographical and Underground detection reports shall be provided by COMPANY for Bidders reference and use. Bidder to perform additional survey to confirm data. Company to confirm.	Existing layouts alongwith proposed modifications for compression unit are already provided. Any further survey & confirmations etc. is included EPCC SOW.
3	General	Site grading	The proposed sites for all proposed facilities are already grading and no additional site grading works are required as part of the scope of works. Company to confirm.	Bidder's understanding is correct, however, EPCC contractor would be responsible for conducting site survey & confirmation to finalize the requirement of grading works.
4	6.0 Civil and Structural engineering	Pressure grouting	Please provide information on where is pressure grouting applicable and to what extent. Company to provide relevant drawings showing extent if available.	The requirement for grouting is already provided in SOW & specifications
5	12.3.12.9 / Drawing no. 4985-CD-7301	Roads, Concrete paving and Gravel paving / Layout plan – approach road	Section 12.3.12.9 refers to construction of new approach roads. The approach road shown in drawing no 4985-cd-7301 are the same roads described in section 12.3.12.9. Company to confirm as the roads are not in scope cloud in the drawing.	Please revisit scope of work, wherein requirement of road works is already mentioned. On drawing # 4985-CD-7301, culvert (New) for crossing of piping is clouded and included in contractor's scope.
6	Drawing no. 4985-PC-2201	DRAWING REFERENCE TO 0221-PC-1001	Drawing refers to 0221-PC-1001 compressor shelter details. Drawing not part of ITB documents. Company to share relevant drawings with bidder.	No such drawing is referred in 4985-PC-2201 and part of tender document. Moreover, such shelter drawings shall be prepared/finalized by EPCC contractor during detailed engineering.
7	General	Adequacy check for existing structures	There will be no adequacy check for structures required as part of the bidder's scope of work. Company to confirm.	Bidder to adhere with requirements as mentioned in tender document regarding adequacy check of existing structures.
8	0221-CA-7001	Applicable Codes & Standards	In this document options to British and American codes have been provided. Bidder proposes to use British codes for all Design, except for Seismic design where IBC shall be used. COMPANY to confirm their acceptance.	Company has no objection, however, in case of any difference between the two more stringent case to be followed by the contractor
9	General	Piperacks	Pipe racks / Pipe bridges shall be built of structural steel with concrete foundations. COMPANY to confirm.	Confirm
10	Appendix-K _Performance bond_	Clause 3) To keep this Guarantee in full force from the date hereof until_____ from the date of issuance or released by authorized person.	Bidder understood that Bidder can chose to keep this Guarantee in full force from the date hereof until_____ from the date of issuance, no need released by authorized person, bidder understanding is right?	Bidder to adhere with requirements as mentioned in tender document
11	Appendix-J _Advance Payment_	Clause 2) To keep this Guarantee in full force for_____ months from the date hereof or until_____ as per satisfaction of Company (OGDCL)	1.Bidder understood that Bidder can chose to keep this Guarantee in full force for_____ months from the date hereof, bidder understanding is right?	Bidder to adhere with requirements as mentioned in tender document
12	4985-ELB-6601-11 (SH 2 of 2)	Key SLD	The scope of work with regards to this SLD is only converting one motor feeder to transformer feeder. All the other equipment are part of existing system. Owner to confirm bidder understanding.	Illustrated motor feeder to be converted to transformer as marked under the clouded region and all the requirement as necessary must be ensured and fulfilled by bidder. Please note that defined scope is not exhaustive and based on FEED Engineering, if any requirement may arise/emerge at the time of detail engineering or during execution phase, it is the responsibility of bidder to make good at their own without any additional cost and time.
13			Can the sheet 1 be shared with the bidder to enable clear understanding of the scope and the existing system especially when system study and review of adequacy of existing equipment is part of bidders scope	Requisitioned sheet is general sheet and represent only the legends and symbols, therefore, requirement bears no relevancy. Further, note that scope defined in project deliverables are already in detail and all the relevant drawings& specs have already been submitted with the subject tender. Therefore, bidder is required to revisit their requirement, however, if required otherwise, will be shared after award of contract.
14			The existing schematic is required to review the modification required. Also details like Vendor name, Panel model number, Serial number and year of manufacture	Typical schematics already illustrated on to 4985-ELB-6602-5 Single Line Diagram for M.V Switchgear, sheet 2 of 3, further details (Vendor drawings) will be shared after the award of contract.Further below are the details of existing panels: Production type: P1X-12 of SCHNIDER Electric, Pakistan and year of production 2013-2014. Any further detail, if required, will be collected/verified by bidder during pre-bid site visit.
15	4985-ELB-6602-5 (SH 2 of 3)	Single Line Diagram for M.V Switchgear	Can the sheet 1 & 3 be shared with the bidder to enable clear understanding of the scope and the existing system especially when system study and review of adequacy of existing equipment is part of bidder's scope.	Scope relevant sheet have already been submitted with tender document, additional detail, if any, will be shared after the award of contract.
16			An additional cubicle is to be added to the existing MV switchgear at UCP 1 and this shall be inline with the schematics of MV switchgear panel at UCP 2 Owner to confirm bidder understanding is correct.	Referred single line diagram (4985-ELB-6602-5, sheet 2 of 3) represent the modification scope in existing switchgear (UCH-II) as stated above (please refer our response against serial no. 01 to 03 of this sheet) and basically the extended part of key single line diagram 4985-ELB-6601-11. Regarding the scope of additional cubicle at UCH-I as required to power-up TR-02A, please refer 0221-ELB-6600-0 (SH 1 of 2), wherein, it is clearly mentioned that new MV panel shall be required and coupled with existing Switchgear at (UCH-I), please refer MCC-UCH-I-LO MCC Layout (UCH-I). Regarding which schematicsf to be followed for added panel at UCH-I, please note that UCH-I schematics to be followed and drawing no. that are mentioned ((3) A2678 S13) represent the existing schematics being followed at UCH-I and same will be shared with bidder after award of contract.

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17	0221-ELB-6600-0	Single Line Diagram 0.4kV Switchgear-MCC	Only one LV MCC is part of bidder scope and other than this there is no LV switchgear is part of bidder scope Owner to confirm bidder understanding.	Complete LV Switchgear/MCC illustrated on respective sheets of (0221-ELB-6600-0), Single Line Diagram 0.4kV Switchgear-MCCas further detailed in LV Switchgear specification and small distribution boards as required for lighting and socketsoutlets mentioned on to section-6 of 0221–ELA-6501, is the part of EPCC contractor/bidder scope and will be designed & provided accordingly. Please note that defined scope is not exhaustive and based on FEED Engineering, if any requirement may arise/emerge at the time of detail engineering or during execution phase, it is the responsibility of bidder to make good at their own without any additional cost and time
18			Clause 5.2.4 mentions Power factor improvement is required. Owner to confirm the target power factor required to be achieved.	Minimum of 0.85
19	0221-ELA-6501	Electrical Design Basis	Clause 5.3.8 mentions that system study is to be carried out. Bidder understanding is that existing ETAP model with up to date inputs of existing system will be made available to bidder Owner to confirm bidder understanding.	Existing study in report format is available and shall be shared with bidder after the award of contract, however, aforesaid study was conducted at the time of very early stages of previous project, therefore, as far as practicable, updated data shall be considered and it is the responsibility of bidder to collect the data at their own, as far as practicable, from the site and from project deliverables available in documented format.
20			Clause 6.6.13 Is it possible for Owner to provide soil thermal resistivity.	Please refer our response against the pre bid clarification no. 5 (PBC-05), wherein, available soil investigation report have already been shared with bidder.
21	0221-A-1001-0 (Basis of Design）	Process	Please provide wells full composition and physical property.	Refer to Annexure-IV, Basis of Design, for wells' compositions. Furthermore, it is to note that bidder shall develop simulation and H&MB of all area under study covering all critical and important relevant properties as already mentioned in SOW.
22	0221-GS-9510-3 _Spec for Centrifugal Compressors_	Instrument	According to ITB and compressor specifications, each compressor is equipped with 4 flame detectors, 2 heat detectors and 1 combustible gas detector. Please clarify,Which part of the compressor needs to be monitored by two heat detectors.Whether F&G device is required for fuel gas skid. Whether need to set the manual alarm button.	Kindly refer the Document # 0221-GS-9510-3 _Spec for Centrifugal Compressors_, Clause 3.1.7.3 **Turbine / Compressor Control System General Requirements** , under sub Heading "**F&G System** for detail. Bidder to note that Minimum details and quantities for detectors have been defined in project documents. EPCC contractor shall review and confirm the exact quantities during detailed engineering stage based on F&G Mapping Study Report.
23	ITB 5.18	Instrument	According to ITB and P&ID, Methanol Injection signal access Wellhead Control/SCADA system, please provide the data type and quantity.	Kindly notet that the mentioned information Shall be shared with the successful bidder after contract award.
24	Instrument	Instrument	Please provide instrument design documents: control system specification, MTO, instrument data sheet, cable list, etc.	The basic requirements and basis has already been mentioned in tender documents. However, bidder may colect further information during pre-bid site visit. Further the detailed design documents will be prepared by EPCC at detailed engineering stage and shal submit to ENAR/OGDCL for approval.
25	Vol II-IIB Mechanical-Specifications	MEC	please provide Specification for Stairs, Handrail and Platform and Specification for Equipment Welding	Please refer Doc No. 0221-PA-2004-A (Specification for Steel Structure) for referred details.
26	Vol II-IIA Process-Datasheets-0221-DS-1705-0 (Cooling Water System	MEC	The material of cooling tower is S235JR, which does not meet the ASME Section II required in 0221-PA-2005-0, please confirmed it.	Bidder to finalize/advise the suitable material during detailed engineering in the light of requirements of tender document and submit to ENAR/OGDCL for review and approval.
27	SEC - III Scope of Work 8.0	Safety and Fire fighting	Please kindly provide the standard “Pakistan Petroleum Act, 1934, NFPA”.	It is the responsibility of EPCC contractor to arrange /follow all such rules & regulations applicable in Pakistan.
28	SEC - III Scope of Work 8.0	Water Process	Please kindly provide Specification for Cooling Water System.	Please refer Doc No. 0221-DS-1705-0 (Duty Specification for Cooling Water System Package)
29	Documents required	MER	Please provide the datasheet for Gas turbine.	Please refer sec.8.2 of Doc. No. 0221-GS-9510-3 (Spec for Centrifugal Compressors) for gas turbine related details. Further, EPC contractor to develop and submit gast turbine datasheet for OGDCL/ENAR review/approval during detail engineering stage.
30	Documents required	MER	Please provide the Specification for Pumps	Please refer attached Specification no.0221-PA-2012 (Specification for Centrifugal Pumps)
31	Electrical	EL	Please supply overall outdoor lighting layout.	Development of layouts is the part and scope of EPCC contractor/bidder, therefore, lighting layout, along with its typical, will be developed and updated by bidder, however, existing lighting layout available at OGDCL will be shared after the award of contract. Please note that layout available at OGDCL end may not be updated to the extent of as-built, therefore, it is the responsibility of bidder besides the updation/development of scope that comes under the subject project, will also update existing information as necessary to integrate new system with existing system.
32	Electrical	EL	Please supply overall Earthing layout.	Development of layouts is the part and scope of EPCC contractor/bidder, therefore, layouts, along with its typical, will be developed and updated by bidder, however, existing earthing layout available at OGDCL will be shared after the award of contract. Please note that earthing layout available at OGDCL end may not be updated to the extent of as-built, therefore, it is the responsibility of bidder besides the updation/development of scope that comes under the subject project, will also update existing information as necessary to integrate new system with existing system.
33	Electrical	EL	Please supply Load shedding scheme, Load Shedding Block Diagram and Load Shedding Multiplication Cabinet Wiring Diagram. Please make sure there is enough load shedding spare terminal for new load.	Complete design up to the evaluation of existing load shedding system is the part of EPCC contractor/bidder scope. If existing load shedding panel lacking in spare terminals, necessary wiring and so on, then shall be provided and made good by bidder. Any information as required to evaluate the aforesaid panel shall be collected/obtained at/from siteby bidder during pre-bid site visit.

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34	Electrical	EL	Please supply 110V DC power supply single line diagram.	Bidder is required to determine the expected 110V DC power (kW) required from existing 110V DC system and shall verify during pre-bid site visit. If it appears that existing system is not enough to accommodate then new 110V DC system shall be providedas already mentioned in relevant project specifications/scope. Similarly, if additional breakers are required in existing 110V DC DB then suitable Amps rating breaker shall be selected, designed and installed accordingly by bidder, as the case may be.
35	IIC Electrical - 0221-ELA-6501 Electrical Design Basis 5.2.4 The Contractor shall be responsible to assess the requirement of Power factor improvement plant, the Contractor shall design, supply, install, test and commission the Power factor improvement plant (PFI) accordingly.	EL	The contractor shall make sure the power factor of new substation should be above 0.9. Please confirm it.	Confirmed, however, minimum of 0.85 is also acceptable.
36	5.4.4 a) LV Incomers/Switchgear/MCC - Incomers shall be protected through integral microprocessor based LSIG protection units in Air circuit breakers, along with all necessary protection as required to establish the secondary selective residual bus transfer scheme as defined above and other project documents.	EL	What does LSIG stand for?	LSIG electronic units is basically the integral part of ACB's protection unit that normally provide adjustable time/ current tripping characteristics of protection in following ways: - L = Long Time (overload protection, analogous to the inverse-time thermal trip of a thermal/magnetic breaker) - S = Short Time (short circuit protection of low level faults) - I = Instantaneous (short current protection of high level faults, analogous to the instantaneous magnetic trip of a thermal/magnetic breaker) - G = Ground Fault (equipment ground fault protection). Therefore, LSIG = Long-time + Short-time + Instantaneous + Equipment Ground-fault Protection
37	7.2. The entire building electrification work shall be carried out by the Contractor and shall be authorized to undertake such work under the provisions of the Electricity Act 1910 and The Electricity Rules 1937 as adopted and modified to-date by the Government of Pakistan.	EL	Please supply the standards :the Electricity Act 1910 and The Electricity Rules 1937 as adopted and modified to-date by the Government of Pakistan.	Availability of Electricity act and any other federal and provincial rules & regulation as applicable shall be responsibility of EPCC contractor/bidder. ETAP software shall be used to conduct for electrical studies and setup files shall be shared with OGDCL/ENAR.
38	5.3.8 As informed by OGDCL, power generator at both facility (UCH-I & UCH-II) is adequate to meet the demands of subject project, however, EPCC shall further evaluate and validate by carrying out minimum following detail studies of each facility and develop different scenario .i.e. normal, emergency and any other contingencies being faced by OGDCL during operation. -- Load Flow Studyand -- Motor starting and transient Analysis Study - -Harmonic Analysis Study 5.3.10 Similarly, fault levels of existing system and new will be determined by EPCC. To do so, following studies will be performed and different scenarios as in the above case will be developed. - -Short circuit Study -- Relay co-ordination study	EL	EDSA or ETAP will be used to do the caculations of electrical system.Please confirm it.	ETAP software shall be used to conduct for electrical studies and setup files shall be shared with OGDCL/ENAR.
39	Material	Material	Please kindly provide the missing related documents listed below: 1) Material Selection Diagram 2) Material Selection Report 3) Specification for Piping Welding 4) Specification for Piping Material in sour service 5) Specification for Fitting Material in sour service 6) Specification for Flange Material in sour service	1 & 2) EPCC contractor to carryout referred study/diagram during detailed engineering stage. Please refer sec.1.1.2 of scope of work in this regard. 3) Please refer attached Specification no.0221-PA-2013 (Specification for Fabrication & Installation of Piping) 4,5,6) Please refer Doc. No. 0221-PA-2000-A (Specification for Piping design and Material) where all such requirements are mentioned w.r.t sour service.
40	0221-PA-2000-0 (Specification for Piping design and Material) Section 3.6 Part d: For ASME Class 600 flange and lower, tubing is acceptable for instrument impulse lines downstream of the first block valve with 316 stainless steel annealed tubing for non-chloride containing services and carbon steel tubing for chloride containing services.	Material	In Section 3.6 part d, tubing material is carbon steel which is used for chloride containing services. Please kindly confirm the tubing material is correct and suitable for the service condition.	Bidder to adhere with requirements as mentioned in tender document.
41	Please kindly provide the NDT method and NDT frequency for butt welds in carbon steel and low alloy piping which operates above -20°F (-29ºC).	Material	Please kindly provide the NDT method and NDT frequency for butt welds in carbon steel and low alloy piping which operates above -20°F (-29ºC).	EPCC Contractor shall submit NDT method for ENAR/OGDCL review/approval during detail engineering stage.

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42	0221-PA-2000-A (Specification for Piping design and Material) Section 8.0: All piping materials shall be compliance with NACE MR-0175/ ISO 15156.	Material	Please kindly confirm that all piping materials including used for Instrument Air, Nitrogen, Firewater and etc. shall be compliance with NACE MR0175/ISO 15156.	Please refer 0221-PA-2000-0 (Specification for Piping design and Material); Section 4(a) where it is stated that piping for sour gas service shall require NACE MR0175 / ISO15156 compliance.
43	0221-PA-2000-A(Specification for Piping design and Material) Annexure-I	Material	For Spec AC, BC, DC1 and DC2, the piping system material are SS304L, SS316L or SS316/316L (dual grade), and the bolt & nuts material are A193 B7M/A194 2HM+Zinc Yellow bichromate or A320 L7M/A194 7M+Zinc Yellow bichromate. Please kindly confirm if Zinc Yellow bichromate coating can be used for stainless steel connection. And it is suggested to use XYLAN Fluoropolymer Coated for bolt & nuts. Please confirm. Meanwhile, please kindly confirm if hot dipped galvanized bolt & nuts can be used for DSS connection in spec DD.	Not acceptable.Bidder to adhere with requirements as mentioned in tender document.
44	0221-PA-2000-A (Specification for Piping design and Material) Annexure-I	Material	For spec AB2, the bolt & nuts is A320 L7/A194 7+Zinc Yellow bichromate. Please confirm if the bolt & nuts is A320 L7M/A194 7M+Zinc Yellow bichromate to follow NACE MR0175/ISO 15156.	For Spec AB2, the bolt & nuts shall be A320 L7M/A194 7M+Zinc Yelow bichromate
45	0221-PA-2000-A (Specification for Piping design and Material) Annexure-I	Material	For spiral wound gasket used for spec BA2, BC, DA1, DA2, DA3, DC1 and DC2, the gasket material is SS316+Non asbestos filler with carbon steel outer and inner ring. ℃ ℃ It is suggested to use SS316L+Flexible Graphite with SS316L inner ring and CS (DT≥-29) / SS316L (DT＜-29) outer ring. Please confirm.	Not acceptable.Bidder to adhere with requirements as mentioned in tender document.
46	0221-PA-2000-A (Specification for Piping design and Material) Annexure-I		Please kindly supply the spec. AG.	Please refer **"AA2"** piping spec instead of **"AG"**
47	Vol II - Drawings IFB Civil	Civil	Please provide topographic drawing of UCH.（dwg file)	Native (dwg) file will be shared with the successful bidder only.
48	Vol II - Drawings IFB Civil	Civil	Please provide plot plan drawing of UCH.（dwg file)	Native (dwg) file will be shared with the successful bidder only.
49	0221-PA-2010-B (Specification for Valves)	Material	It is suggested to use SS316L for ball/plug/gate/disc and seat mateiral, as a minimum, for all CS & SS valves used in sour service only. Please confirm.	Bidder to adhere with requirements as mentioned in tender document.
50			For carbon steel check valves such as VC-102, VC-103 and etc., the disc material is ASTM A216 WCB while the trim mateiral SS 316. It is suggested to use SS316 for disc mateiral, as a mininum. Please confirm.	Bidder to adhere with requirements as mentioned in tender document.
51			For soft seal ball valves 300LB and above, the seat material is RE-INFORCED PTFE OR REINFORCED GRAPHITE. It is suggested to use PEEK/DEVLON/NYLON for seat mateiral. Please confirm	Bidder to adhere with requirements as mentioned in tender document.
52	0221-PB-2105-C & 0221-DS-1706-0 (Instrument Air and Nitrogen Generation Package)		The cooling type of the instrument air compressor is water cooled in 0221-DS-1706-0 (Instrument Air and Nitrogen Generation Package), but it is not indicated in P&ID, please confirmed the cooling type. If air cooler is used, please provide relevant specfication “0193-AEA-001 Specification for Air Cooled Heat Exchanger”.	Yes, the cooling type of the instrument air compressor is water cooled and Cooling water from Cooling tower can be used for the said pupose, however, operating capacity of Cooling Tower shall be increased accordingly.
53	0221-DS-1702-0 (UCH-I Slugcatcher M-210) & 0221-DS-1703-0 (Datasheet for Suction Scrubbers)		the material of slug catcher and suction scrubber are SA-516 Gr.70 (with 304L cladding), corrosion allowance is usually not considered for cladding materials, but the CA of head and shell is 6 mm in datasheet, plaese confirmed it.	Bidder to adhere with requirements as mentioned in tender document.
54	4985-PC-2201-2B		Please kindly verify the compressor maintenance space and relevant compressor shed size.	All such information shall be finalized during detailed engineering by EPCC contractor and shall submit to ENAR/OGDCL for approval.
55	0221-A-1004-0		Specify one normal operating point which is also the certified point. Additionally, ONLY ONE certified/guarantee point can be specified. Please Company to confirm which point is the guarranty point.	The compressor package shall be designed in such a way that all cases shall be met under the performance curve of the compressor package with guarantee.
56			Compressor datasheet 0221-A-1004-0 specified both suction throttling and speed variation as process control methed. The specified suction throttling pressure is higher than the suction pressure of any operation point. For control purposes which control method shall take precedent?	Suction throttling valve shall be required for initial compression scenarios as stipulated in the referred datasheet i.e. 835 to 500 Psig. Furthermore, EPCC shall propose or provide viable and optimum controlling method for overall operating envelope.
57			Compressor datasheet 0221-A-1004-0 specified additional run at 250PSIG is specified, what is the gas composition and target discharge pressure for this run? Please Company to confirm.	Composition of Case-03 is to be considered for additional case, however, the discharge pressure would be the same i.e. 865 Psig.
58	0221-A-1004-0&0221-GS-9510-3		Speed variation range is defined as 60% to 105% in datasheet but 70% to 105% in design basis. Please company to confirm which has precedent?	Speed variation range 60% to 105% shall prevail as stipulated in Compressor Datasheet (0221-DS-1701-0) and Process Design of Compressor Trains (0221-A-1004-0).
59	0221-A-1004-0		Dynamic simulation is specified in Datasheet, Company please confirm if is necessary for each compressor.	Bidder understanding is correct.
60	0221-GS-9510-3		Please Company to confirm, if it is necessary to request PTC-10 performance test at shop and at site are both specified for each casing.	Bidder to adhere with requirements as mentioned in tender document.
61	Utility Water Pump		There is a added utility water pump(930-P103C) which is paralleled with existing pumps. Please Company provided the documents of existing pumps.	Refer Annexure-III, Basis of Design.
62	P&ID 56501-F-208 and 0221-PB-2100 SLUG CATCHER		Please Clarify What is the PSV discharge condition of M-200/210. Is BDV201 only opened under fire condition. If there is still overpressure condition, please give the overpressure value.	Refer SOW, Section 2.5, Flare System of UCH-I & UCH-II, for clear understanding.

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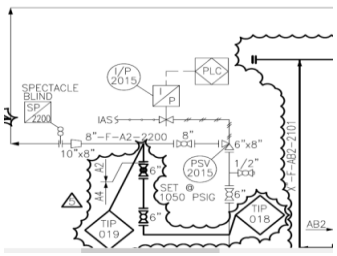
63	P&ID 4985-IMX-6240-0 (Emergency Shutdown for UCH-II) and 0221-PB-2100 SLUG CATCHER		Please Clarify Why only open BDV003 in fire condition, and BDV002 is closed. Please Company kindly to confirm what is the type of PSV in attached drawing（P&ID:UCH Compression Project P&IDs Binder # 005 (IFB) Page 6 with a control signal from PLC. Please double confirm the PSV discharging the overpressure to flare system is not a mechanical type.	It is a typo error, both BDVs shall open in fire case scenario. Furthermore, EPCC shall also check and update existing C&E matrix during detailed engineering Stage. As far as PSV-2015 is concerned, it is to note that PSV-2015 is Pilot operated, that can not be interlocked with PLC, as PSV always operates on mechanical setpoint.
64	SEC - III Scope of Work		Please kindly to confirm the existing DCS & ESD system IO's license limit.	The details will be shared with successful bidder after award. However,the bidder should collect the information during pre-bid site visit and may further calrify during pre-bid meeting.
65	SEC - III _Scope of Work 4.14 “The contractor shall be complete responsible for dismantling, relocation, re-installation, testing and commissioning of electrical equipment of Diesel storage tank (800-TK1010) area and Diesel pumps (800-P101A/B).”		It is necessary to verify the Performance status of on-site motors.	It is the responsibility of bidder to ensure that after relocation the motor is suitable for the intended purpose. And to do so, all the (running and performance) tests as necessary as per manufacturer recommendation shall be carried out to ensure that there is no harm and defects during relocation or dismantling of aforesaid motors/equipment. If defects or any abnormality found that render them not suitable for intended purpose, shall be made good by bidder at their own without any additional time and cost. In either case, Client approval shall be sought in this regards.
66	0221-GS-9510-3 (Spec for Centrifugal Compressors)		as for API 617 edition, 0221-GS-9510-3 8.1.1 indicate that it should be latest version but the reference Datasheet 0221-DS-1701 shows "API 617, 7TH". The latest version should be the 8th version. So it is neccessary to clarify which edition is applicable for this project.	Bidder to refer latest version (i.e. 8th Edition) of referred API standard.
67	Compressor Datasheet 0221-DS-1701-0 SEC - III Scope of Work 3.8 Compressor Spec. 3.2.4		Compressor Datasheet 0221-DS-1701-0 require that the compressor units are located outdoor, as per Scope of Work 3.8 A steel structure shed shall be provided, but Compressor Spec. 3.2.4 specified a steel structure frame compressor house should be constructed. So please clarify which one we should choose, a shed or a house?	Bidder to consider 'steel structure shed' for the compressor while for turbines, bidder to refer sec.8.2.6 of Doc. No.0221-GS-9510-3 (Spec for Centrifugal Compressors)
68	01 ITB Vol. II	Fire Protection & Loss Prevention	Kindly provide the following FEED/ Existing Plant HSE & Loss Prevention Documents for preparing the Deliverable List & MTO. 1. Fire Protection Philosophy 2. F&G Philosophy 3. Fire Fighting & Safety Equipment Layouts 4. Fire Fighting & Safety Equipment Specifications & Data sheet 5. Deluge System Specification (If Available) 6. Clean Agent System specification (If Available) 7. Noise Control Philosophy 8. NGP-007-FIF-15.01-0004-24-02 - Piping Layout for Fire Water System (Unit-35) 9. Existing Fire water pumps, & Storage tank & Distribution P&ID PDF & Native files. 10. FEED stage (QRA/FSA/Flare Study/Noise Study) reports if available. 11. Fire water demand calculation report	1 to 8. The required philosopies, layouts, specifications, data sheets shall be developed by EPCC at detailed engineering stage (wherever required). 9. Editable files of Existing Fire water pumps, & Storage tank & Distribution P&ID shall be shared with successful bidder. 10. Refer FEED stage Blowdown Study Report (Doc # 0221-A-1008-0). Furthermore, EPCC shall check, validate and update existing studies during detailed engineering Stage. Moreover, other necessary studies shall be conducted by Bidder. 11. Refer Process Design of Compressor Trains (Doc # 0221-A-1004-0). Furthermore, EPCC shall check, validate and update existing studies during detailed engineering Stage.
69	ITB Vol.II Scope of Works Section 2.6		COMPANY is requested to clarify the requirement of deluge system for compressor alone or all associated compressor train equipment. COMPANY is requested to provide FW & spray piping PMS. Provide FEED stage Fire water distribution layouts / Fire water distribution P&ID.	Tentatively, turbo compressors' fire water requirement is mentioned in Process Design of Compressor Trains (Doc # 0221-A-1004-0). However, EPCC shall check, validate and confirm the requirement of fire water and shall propose adequate cooling system for turbo-compressors and its associated equipment. Furthermore, refer P&ID # 4985-PB-2203 (Page # 16 P&IDs Binder # 005). P&IDs, piping specification and plot plan already the part of tender document. Layouts to be developed during detailed engineering by EPCC contractor.
70	ITB Vol.II Scope of Works Section 12.3.12.5		COMPANY to Kindly clarify the clean agent system requirement for MCC building and if required pls. clarify the clean agent gas required (FM 200/NOVEC or Inergen system).	Combine Fire Detetction & Suppression System with dedicated Control Panel shall be considrered for new MCC, the system shal be FM-200 based. The Combine Fire Detetction & Suppression System Control Panel shall interrface with exitsing plant F&G System for alarm & monitoring.
71	ITB Vol.II Scope of Works Section 1.2.1		COMPANY is requested to clarify the list of HSE studies (QRA/FSA/Flare Study) to be performed as part of this Project scope. Bidder understand that if these HSE studies (QRA/FSA) are required, the scope is to perform only for new FEC trains and complete UCH I& II train areas are not required / include as part of these studies and Integration is not applicable.	Requirement of Risk studies is already mentioned in the referred clause of SOW. i.e. "Risk Studies (HAZOP, SIL and Safety Assessment) due to installation of New Compressor Packages will be arranged by EPCC Contractor in the presence of OGDCL/Consultant which shall be chaired by the Third party chairman to find out any gaps / risks / hazards, by using a Systematic Approach. After completion of RISK studies, all recommendations will be incorporated by EPCC Contractor in design/drawings and technical specifications." Furthermore, these studies shall also cover modifications in existing system under this project.
72	ITB Vol.II Scope of Works Section 14.5		COMPANY is requested to clarify the 3D F&G mapping study for the Project scope. The fluid stream has H2S, hence the requirement of toxic gas detection is envisaged. COMPANY to confirm.	Bidder understanding is correct for toxic gas detection, further F&G Mapping study shall be conducted by EPCC for each package.
73	ITB Vol.II Scope of Works Section 4.14		Bidder understands that for diesel storage tank (800-TK101) & Pumps existing fire protection measures will be dismantled and reinstalled in new location and no additional fire protection measures (Foam system /pourers/spray system etc.) will be considered as part of the Project scope. COMPANY to confirm.	If existing diesel tank is provided with fire protection measures then same will be dismantled and re-installed along with other associated items as per tender requirements. Bidder to confirm during pre bid site visit
74	General		COMPANY is requested to clarify the requirement of passive fire proofing for pipe racks/air coolers and other critical structures.	Bidder to adhere with tender requirements as mentioned in Doc. No.0221-PA-2005-A (Specification for Unfired Pressure Vessel) regarding fireproofing.

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Item No.	ITB Reference	ITB Description	Query	Response
75	ITB Vol.II Scope of Works Section 2.6		COMPANY is requested to clarify the requirement of safety showers requirement and potable water supply for Methanol injection packages at Eastern Lobe Wells of both UCH-I & UCH-II plants.	No such requirement of safety shower and potable water supply for methaniol injection skid is mentioned in the referred section.
76	4985-CD-7342 R3 SH1-7	Building Services requirements	**1.** Are the building/room listed below included in the scope: a. Administration Building b. MCC Room c. Control Room Guard Room 01 d. Operator and Change Room e. New MCC Room (for Compressor Unit) **2.** Are these buildings located in SAFE area? **3.** Do we need to design these buildings under positive pressures?	1. New MCC Room & Transformer yard for compression unit would be included in scope. Please also refer scope of work & drawings. 2. Yes. 3. Refer Scope Of Work.
77	scope of work,12.3.14, electrical installation, hook up and testing, page 76	A Cathodic protection system shall be evaluated, supplied and installed by EPCC Contractor for corrosion protection against underground pipes and diesel tank (which will relocated from existing location) to be developed by EPCC Contractor.	Contractor understands existing CP system shall be evaluated for diesel tank and UG piping. Contractor requests Company to provide the existing CP details for consideration.	Cathodic protection data of existing system shall be verified by bidder during pre-bid site visit and ascertain that whether it is feasible to relocate & to be used again for the new system or not. If it is not suitable to re-utilize then new CP system shall be designed and provided accordingly.New CP system shall be designed and supplied in accordance with requirements stipulated in updated version of NACE standards. New CP system shall be based on impressed current method and anode system based on closely distributed system shall be applied to underground piping and conductive polymeric anodes (Anode flex) for on-grade Storage tanks
78	0221-PA-2002,General Specification For Painting section 1.2	Nonferrous materials (stainless steels, aluminium, etc.) unless specifically required	Contractor understands all SS,DSS and SDSS equipment and piping shall not be painted .Contractor understands only Carbon steel equipment and piping shall be painted.	Bidder understanding is correct. Further, bidder to adhere with requirements as mentioned in referred document and any other document of tender document.
79	Section III, Scope of Work, Cl. 3.7.1.6 of Basis of Design (0221-A-1001-0).	Three different Painting Specifications are covered in ITB Documents (i.e. Basis of Design (0221-A-1001-0), SOW Mechanical Section (15.3) and Mechanical Specification ITB Package). Details are as follows: 1) General Specification for Painting (0221-PA-2002) available in Mechanical ITB Folder. 2) **General Specification for Painting (0221-GS-9502) specified in Cl. 3.7.1.6 of Basis of Design (0221-A-1001-0).** 3) General Specification for painting (0193-GS-001) specified in Section 15.3 of Scope of Work.	COMPANY is requested to confirm the Painting Specification applicable for this Project. Kindly also provide the painting specifications listed in Sr. Nos. 2 & 3 if these are applicable.	Bidder to consider Doc. No. 0221-PA-2002-A (General Specification for Painting) available in Volume II B Mechanical tender documents.
80	Section III, Scope of Work, Clause 3.6	To perform material selection study based on corrosion management philosophy and expected design life of compression facility.	COMPANY is requested to provide the Corrosion Management Philosophy.	Bidder (after award of contract, if successful) shall develop Corrosion Management Philosophy during detailed engineering and shall submit for ENAR/OGDCL review. Upon its approval, bidder shall carry out Material Selection Report
81	Vol II, 0221-PA-2005-A (Specification for Unfired Pressure Vessel), clause 6.5	Nozzle loading	All the Nozzle loads shall be provided (F_L, F_C, F_A, M_L, M_C , M_T).	Mentioned loads are the 'minimum' requirements.Vendor/Packager to provide nozzle loadings of the equipments which shall be used for stress analysis by the EPCC contractor.
82	Vol II, 0221-PA-2008-A (Specification for Hydrotesting - Piping)	Hydrotest for Piping	With reference to the mentioned ITB, only Specification for Hydrotest-Piping is available. Shall the EPC Contractor follow ASME Sec VIII, Div 1 (UG-99) Hydro test conditions as default?	Bidder to adhere with requirements as mentioned in referred specification where applicable codes and standards have also been mentioned.
83	UCH-II, Overall Plot Plan	4985-PC-2201	Please provide all relevant drawing information of diesel tank (800- TK1010) and diesel pump (800- P101A/B) to be removed.	P&ID has been provided for reference, Further, tentative location is also marked on plot plan. Bidder to evaluate its quantum of work on the basis of P&ID and plot plan. Please note that the relocation of diesel tank, pumps, piping and associated system, complete in all respect shall be the responsibility of EPCC as mentioned in tender documents.
84	SEC - III _Scope of Work, Section 1.1.11	Final tie in	Bidder understanding that all the final piping tie in works will be executed during the plant shut down. Hence hot tapping is not required for any of these tie ins. COMPANY to confirm.	Referring to Sec.3.6 of referred document, bidder to develop/finalize tie-in schedule depicting type of tie-ins as per tender requirements.
85	SEC - III _Scope of Work, Section 2.6	Methanol Injection Skid	As per Bidder understanding, 8 number of new methanol injection skids at Eastern Lobe Wells of both UCH-I & UCH-II plants shall be installed for each wells. Bidder request COMPANY to provide FEED/ Existing documents/ drawings (Plot plan, GA, Layout etc.); for the 8 No. of Wellheads listed in table in P&ID (0221-PB-2200).	Please refer attached Drawing no. 0221-PC-2201-A (Typical Plot Plan For Wellheads).
86	SEC - III _Scope of Work, Section 3.6-K	3D modelling	Bidder request COMPANY to provide the 3D model software name/requirement to be consider for the project.	Bidder may use any CAD piping software for 3D model. However, NAVISWORKS shall be used to review it.
87	SEC - III _Scope of Work, Section 3.6	Detailed 3D layouts of compression facility.	Company to clarify whether Bidder to consider the total project in 3D, which involve all the disciplines or to consider only the compression facility (3 compressor package exclude all the packages) with Mechanical & Civil only. Also Bidder assumes that COMPANY will provide the existing 3D model database during the EPC stage if the total project to be executed in 3D. COMPANY to clarify	Successful Bidder to consider total project in 3D. Bidder shall submit 30%, 60% and 90% completed versions of 3D model for ENAR/OGDCL review and approval.
88	0221-PA-2000-A (Specification for Piping design and Material)-Section 3.5	Vents, Drains, and Sample Connections	High point and drain point drain valves requirements are not clearly mentioned in the document. As per Bidder understanding valves will be required only for the critical services such as process lines. For the utility services can consider without valves as per section 3.5.c.COMPANY to confirm.	Referring to Sec.3.5d, bidder to provide high point vent valves.

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Item No.	ITB Reference	ITB Description	Query	Response
89	P&ID(4985-PB-2203) & Overall all plot plan (4985-PC-2201)	Existing diesel storage tank.	As per the P&ID and the overall plot plan drawing the existing storage tank and the associated items shall be relocated as mentioned in plot plan location. Bidder request COMPANY to provide the existing piping layout drawings of the diesel storage, the existing detail P&ID and the FEED piping drawings the new proposed area. Also bidder noticed that the existing skid is not mentioned in the new proposed location. COMPANY to clarify	P&ID has been provided for reference, Further, tentative location is also marked on plot plan. Bidder to evaluate its quantum of work on the basis of P&ID, plot plan and during pre-bid site visit.
90	General Documents		Bidder request COMPANY to provide the below mentioned document; a) Piping wall thickness calculation report. b) Stress Analysis report c) Typical pipe support drawings	Mentioned documents are part of detailed engineering and shall be finalized by EPCC contractor during detailed engineering.
91	0221-PA-2000-A (Specification for Piping design and Material)-Annexure-I	Piping class	The following piping classes are not covered in the Annexure-I a)DC b)A4 c)AG Bidder request COMPANY to provide these piping class. Since these classed are required for the material cost estimation.	a) Attached b) Attached c) Please refer "AA2" piping spec instead of "AG"
92	0221-PA-2000-A (Specification for Piping design and Material)-Annexure-I	Piping class-DC	“DC” piping class is mentioned for majority of the process lines. But the piping class is not covered in the Annexure-I. Only DC1 and DC2 class are mentioned with the line size limit up to 24” and 28” only (inlet line size is 36” for slug catcher). COMPANY to clarify whether Bidder can consider DC2 piping class instead of DC with Bidder calculated wall thickness for the sizes not covered in the piping class	"DC" spec is attached
93	0221-PA-2000-A (Specification for Piping design and Material)-3.12	Union	For threaded connection as Bidder standard practice full coupling will be consider for the straight pipe connection instead of unions and unions will be used for the direction change. Bidder request COPANY whether can consider the same.	Bidder to adhere with requirements stipulated in tender document.
94	0221-PA-2000-A (Specification for Piping design and Material)	Revision	Bidder noticed that several piping class are not included in the document and the revision document is the first submission (Rev. A). Bidder request COMPANY to provide the final documents which include all the piping class as per the project scope.	Consider the Rev.A as Final Revision. Moreover, missing specs are attached.
95	0221-PA-2000-A (Specification for Piping design and Material)-Annexure-I, Section -8.2	AA1	For 3” onwards the pipe material specified is ASTM A106.But for flanges and fittings galvanization is mentioned with butt end connection. Bidder understanding that for 3” onwards galvanization is not required. COMPANY to confirm.	Bidder to adhere with requirements stipulated in tender document.
96	0221-PA-2010-B (Specification for Valves)	Datasheet for 36” manual ball valve for the slug catcher inlet line (M-200/210)	Bidder request COMPANY to provide the datasheet for the 36” manual ball valve for the “**DC**” piping class	Datasheet upto 24" size is already the part of tender. Bidder to modifiy (if required) the same for 36" manual ball valve and will submit to ENAR/OGDCL for review and approval at the time of detailed engineering.
97	0221-PA-2010-B (Specification for Valves)	Flange surface finish	As per the general notes, Contact faces of flanges to be 250 to 500 micro inch (6.3 to 12.5 micro metre) roughness which is not in line with Specification for Piping design and Material document (0221-PA-2000-A)-section 3.3, flange requires 125 micro inch Ra minimum to 250 micro inch Ra maximum. Bidder understanding is that the Ra shall be 125 to 250 micro inch (3.2 to 6.3 micro metre) only. COMPANY to clarify.	Bidder understanding is correct. Further, bidder to adhere with requirements as mentioned in referred document and any other document of tender document.
98	0221-B-1511-0 (HMBs) rev-0	Feed gas Composition for Summer & Winter conditions.	As per the referred document Summer and winter cases are indicated. However as per the Basis of Design (Doc. No. 0221-A-1001-0) Appendix-IV no separate composition for summer and winter are indicated. Bidder understanding is that the same composition as provided in Appendix-IV to be used for respective plant summer and winter conditions. Clarify.	Bidder's understanding is correct.
99	Master Document Index (Process)	Isolation Philosophy and Vent & Drain Philosophy.	The mentioned Philosophies are not provided as part of ITB documents. Bidder understanding is that for isolation, venting and drain of equipment and other systems shall be as per FEED P&IDs. Bidder request COMPANY to provide the existing Isolation Philosophy and Vent & Drain Philosophy.	Bidder to refer P&IDs as 'base document' (part of tender document) where isolation related information has laready been provided.
100	Scope of work	Compressor case.	As per referred document section 2.0 it is stated that compressor rated case is case 2 and normal operating case is case-3. Bidder’s understanding is that case-1 is not the guarantee case. Certified cases are Case2 and case 3, Please confirm.	The compressor package shall be designed in such a way that all cases shall be met under the performance curve of the compressor package with guarantee.
101	0221-A-1004-0 (Process Design of Compressor Trains) section 3.2.	Suction Scrubber sizing standard	COMPANY to provide information regarding the standard to be used for sizing of the suction scrubber. Also inform which standard is used during FEED stage for sizing estimation.	Preliminary sizing of Suction Scrubber is carried out considering two stage vane type Separator which shall be confirmed by EPCC. As far as sizing is concerned, in-house software is used based on reknowned engineering practice.

UCH COMPRESSION PROJECT

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PRE-BID CLARIFICATION-11

Item No.	ITB Reference	ITB Description	Query	Response
102	1) UCH Compression Project P&IDs Binder # 005 (IFB) 2) Basis of Design	1) Refer to Compressor PID (page No. 29 of 40), All instrument associated with anti-surge controller shall be conventional type **and will not be of smart type.** 2) Refer to Basis Design (page 13 of 143), clause no. 3.8, All the instruments installed in field and supplied with Compressor skid packages **shall be electronic "SMART" type with 2 wire 24VDC loop power configuration.**	Refer to both ITB requirements, Bidder understand that all instrument shall be supplied smart type except for Anti-surge Instrumentation. Company to confirm bidders understanding.	Bidder undertanding is correct; however the selection of instrument type shall be further finalized during detail engineering stage.
103	1. Sec. III Scope of Work, Mechanical Testing of Packaged Units 2. Vol IIB Mechanical, 0221-GS-9510-3 (Spec for Centrifugal Compressors)	The packaged Compressor units shall be tested in the Vendor's works prior to shipment. Such tests may include hydro-testing of on-skid pipe work. **Under such circumstances, it may not be necessary to retest such systems on site provided t**hat the EPCC Contractor can provide all documentary evidence that the required tests have been carried out at vendor's workplace and witnessed by the EPCC Contractor's & OGDCL/Consultant. 2. Refer to 2.0, SUPPLIER'S SCOPE OF WORK, the specification of the EPCC Contractor covers the minimum requirement but not necessarily limited to the design, supply, shop testing, and **site performance test of three (03) turbo-compressor packages.**	Refer to both ITB requirements for site testing, we understand that Vol I Scope of Work III requirement given at point no 1 prevails. Accordingly, Site test is not applicable for the Compressor package for this project. Please confirm our understanding. Also testing with gas available at shot is acceptable, if process gas is not available.	Referring to Sr.No.1, this requirement is related to "On-Skid Piping" only. However, complete turbo-compressor unit shall be tested as per requirements mentioned in tender document.
104	1. Cl No. 2.1.2, of Project Specification, Turbo - Compressor Units 2. Cl No. 2.1., of Vol I, Section III, Scope of Work, Turbo compressor trains	1. The selected compressors will be **high-speed multistage, centrifugal type driven by Industrial gas turbine.** 2. Each turbo compressor contains **single Stage centrifugal Compressor** driven by Gas Turbine with other BOE (balance of equipment.	We understand that Volume I, Sec III, Scope of Work Requirement (@ sr. no. 02) prevails for this project i.e. **Single stage, Centrifugal API617 Compressor.** Please confirm our understanding.	As per Sec-III. scope of work requirement, Each turbo compressor contains **Single Stage centrifugal Compressor driven by Gas Turbine** with other BOE (balance of equipment).
105	Cl No. 2.1.2, of Project Specification, Turbo - Compressor Units	Supplier shall confirm that the similar Industrial Gas Turbine are available in ready stock in their shop to be replaced with the supplied one on exchanged basis for major overhaul or any repair maintenance job not possible at site during the life cycle of engines	Need scope clarity on this clause requirement. Company shall clarify whether this additional unit shall be part of Scope of Supply for this project or shall be optional price shall be arranged only.	Bidder to confirm only at this stage that requisite will be available in ready stock in their shop to be replaced with the supplied one on exchanged basis for major overhaul or any repair maintenance job not possible at site during the life cycle of engines
106	1. 0221-A-1007-0 (Operation and Shutdown Philosophy), Sr. No. 02, Para No. 05 2. 0221-GS-9510-3 (Spec for Centrifugal Compressors), 3.1.4, Lube Oil System	1. New turbines shall have their own dedicated lube oil system 2. Lube oil system for the complete train (turbine/compressor) shall generally be in accordance with API 614	We understand that common or dedicated Lube oil System shall be as per Vendor Recommendation, based on oil required for lubrication. Please confirm our understanding.	Dedicated lube oil system shall be required for each Turbo-Compressor as already mentioned in referred section.
107	0221-DS-1706-0 (Instrument Air and Nitrogen Generation Package), Package Requirements	Input of a pressure control signal from an instrument air pressure indicator controller downstream of the instrument air receiver (supplied by others).	Refer to this note requirement, we understand that Company is intended to exclude the receiver from IA&N2 Package vendor scope. However, refer to PID for IA and N2 Package, it shows under Package vendor scope only. Bidder shall proceed with PID scope demarcation. However, this shall be decided during detail engineering long with vendor.	Bidder to follow referred P&ID for the said issue.
108	0221-DS-1710-0 (Datasheet For UCH-II Utility Water Pump 930-P103C)	Existing Pump Documents/ Data Sheet/ Specification	Existing Pump documents (filled in) to be shared to align new pump model with existing unit.	Refer Annexure-III, Basis of Design.

UCH COMPRESSION PROJECT

ISSUED FOR BIDDING

A	15th April, 2020	Issued For Bidding	MA	SFA	SFA	MPM	FS		
REV	DATE	DESCRIPTION	ORIG	CHKD	LE	QA	PM	LPE/TA	
REVISIONS			APPROVAL					OWNER APPROVAL	

ENAR Petrotech Services (Pvt.) Limited , 7-B , Sector 7-A , Korangi Industrial Area , Karachi Pakistan

TITLE:

SPECIFICATION FOR CENTRIFUGAL PUMPS

PROJECT NUMBER
14-0221

DOCUMENT NO:

0221 – PA – 2012 – A

	PROJECT CODE	DOC. TYPE	SEQ NO.	REV	

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1.0 SCOPE

This specification covers the minimum technical requirements for the design manufacture, testing, inspection, supply, installation and commissioning of Centrifugal pumps. This Specification is generic and covers hot oil and chilled water services as well.

1.1 General Requirements

The pumps are to be installed outdoor in hazardous areas.
The characteristics, climatic data & other generalities are given in the "Design Basis".
The Contractor shall assume full unit responsibility for the complete Centrifugal Pump(s) package and all ancillaries.

1.2 Definitions

Company means Oil & Gas Development Company Limited (OGDCL) and Contractor means the firm executing Design, Engineering, Procurement, Transportation, Fabrication, Construction, Installation, Testing, Commissioning of the plant, Supplier/Vendor/ Manufacturer/Sub-Contractor. This definition shall apply throughout this specification.

1.3 Errors or Omissions

1.3.1 The review and comment by the Company of Contractor's or its manufacturer's drawings, procedures or documents shall only indicate acceptance of general requirements and shall not relieve the Contractor of its obligations to comply with the requirements of this specification and other related parts of the Contract Documents.

1.3.2 Any errors or omissions noted by the Contractor in this Specification shall be immediately brought to the attention of the Company.

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1.4 Deviations

All deviations to this Specification, other related specifications or attachments shall be brought to the knowledge of the Company as a section in the bid. All deviations made during the procurement, design, manufacturing, testing and inspection shall be with written approval of the Company prior to execution of Work. Such deviations shall be shown in the documentation prepared by the Contractor.

1.5 Conflicting Requirements

In the event of any conflict, inconsistency or ambiguity between the Contract scope of work, this Specification, National Codes & Standards, referenced in the Project Specification or any other documents, the Contractor shall refer to the Company whose decision shall prevail.

1.6 Reporting Procedure

1.6.1 A reporting and documentation system shall be agreed between the Company and the Contractor for the status of procurement, design, manufacturing, inspection, testing and shipment of the equipment/material to be supplied under this specification. Contractor's manufacturer shall provide reports and summaries for production performance and testing operations in conformance with a manufacturing schedule approved by Company.

1.6.2 Weekly, monthly and run summaries of all major aspects of the production process shall be provided as reports to the Company.

1.7 Third Party Inspection

In addition to the inspection and witnessing of tests by the inspectors to be appointed by the Contractor during the manufacturing and shipment of the equipment/material, Company may appoint a third party or it own inspector for witnessing of the inspection and tests to be carried out at manufacturer’s facility under this specification.

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1.8 Contractor Responsibility

The Contractor shall be responsible for the complete design, manufacture, supply, inspection, testing and commissioning of the pump units, including full compliance with all applicable design codes and standards, including those listed in Section 2.0 of this document and the requirements of the certifying authority, if applicable.

2.0 CODES & STANDARDS

2.1 The pump(s) shall be designed, manufactured and tested in accordance with the requirements of this specification, other referenced Project Specifications and the Latest Editions of following Codes, Standards and Statutory Regulations (where applicable):

• API Standard 610	Centrifugal Pumps for Petroleum, Petrochemical & Natural Gas Industries.
• API Standard 614	Lubrication, Shaft Sealing and Control Oil Systems and auxiliaries for Petroleum, Chemical and Industry Services for Special Purpose Applications
• API Standard 615	Sound Control of Mechanical Equipment for Refinery Services
• API Standard 670	Non-Contacting Vibration and Axial Position Monitoring System
• API Standard 678	Accelerometer Based Vibration and Axial Position Monitoring Systems.
• ASME VIII DIV I	Pressure Vessels
• ANSI B.1.20. 1	Pipe Threads General Purpose (inch)

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- ANSI B.16.5 — Pipe Flanges and Flanged Fittings NPS ½" through NPS 24"
- ANSI B.31.3 — Petroleum Refinery Piping
- ISO Standard No.1940 — Balance Quality of Rotating Rigid Bodies

2.2 In addition to the requirements of this General Specification, all requirements of the governing Statutory Authority, i.e., in the country and/or its subdivision where pumps are to be installed, shall be met.

3.0 SCOPE OF SUPPLY

3.1 General

The Contractor shall be responsible for the design, production of materials, manufacture, assembly, supply of drawings and data, all sub-Contractor coordination, testing and guarantees, plus the provision of skilled personnel for the testing and commissioning of the complete unit(s).

3.2 Scope of Supply

3.2.1 The scope of supply for each pump unit shall include, but not be limited to, the following:

- Pump.
- Driver.
- Flexible coupling, complete with suitable guard (non-sparking).
- Rigid Coupling.
- Baseplate (drain rim type) to accommodate pump, driver and all ancillary equipment.

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- All necessary interconnecting pipework and valves terminating at the edge of the baseplate.
- Mating flanges for the pump suction & discharge nozzles
- All necessary instrumentation and controls.
- All necessary start-up and commissioning spares, as well as consumables such as grease/ lube oil etc.for pumps having antifriction bearing.
- All special tools required for maintenance of the pump unit.
- All necessary noise suppression equipment.
- All documentation as requested in this specification and its attachments.
- Inspection and testing as called for in this specification and its attachments.

3.2.2 The Contractor shall be responsible for the complete design, engineering, coordination, inspection, testing, delivery and proper functioning of the equipment, not withstanding any omissions from this specification.

4.0 ENVIRONMENTAL DESIGN CRITERIA

Please refer to Design Basis (Doc. No. 0221-A-1001)

5.0 DESIGN REQUIREMENTS

5.1 General Design Specification

5.1.1 Except where amended by this specification, the design of centrifugal pumps shall be in accordance with the requirements of API 610, Centrifugal Pumps for Petroleum, Petrochemical & Natural Gas Industries General Refinery Service.

5.1.2 For general service applications, where API 610 is not specifically requested, the Contractor may offer his standard design for consideration, provided it is guaranteed

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for the specified duties and approved by the Company. Design Margin of 15% shall be taken into account.

5.1.3 The following sections indicate amendments and additions to the various requirements of API 610 (2010) with the relevant paragraph numbers of that standard cross referenced in brackets, where appropriate. The Contractor is to review the following amendments/additions in light of the latest edition of API 610.

5.1.4 If the pump require by pass flow for the specified operating conditions, the pump shall be designed to operate at a capacity which includes the by-pass in addition to the specified capacity. The head curve of the pump shall be continuously rising from the specified operating point to the shut off point.

5.1.5 Unless otherwise specified, all casings shall be provided with connections for vent and drain with block valve and cap. Vent connections may be omitted if the pump made self-venting by the arrangement of the nozzles

5.1.6 Impellers shall be constructed as single piece casing. Impellers shall be statically and dynamically balanced to insure smooth operation. Impellers shall be keyed to the shaft.

5.1.7 Shaft shall be made into one piece, and shall be provided with sleeves locked to the shaft.

5.2 (6.1) General

(6.1.3) **Addition**

Impellers with vanes on the back for balancing axial thrust shall not be used without specific approval by the Company

Balancing of axial thrust shall be achieved by means of individually balanced impellers, opposed impeller arrangements or the use of balance pistons/drums. However, balance pistons shall not be used on applications involving the pumping of liquids containing abrasives.

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(6.1.4) **Addition**

The NPSH required shall be at least 1.0 meter less than the NPSH available.

(6.1.7) **Amendment**

Pumps shall have stable head/capacity curves, which rise continuously to shut-off. The head rise shall be at least 10 per cent of the rated head.

(6.1.8) **Amendment**

Pumps with rated capacity to the right of the best efficiency point on the head/capacity curve are not acceptable.

5.3 (6.3) General

(6.3.5) **Addition**

The suction side of all pumps handling hydrocarbons shall be designed for the full discharge pressure unless otherwise approved.

(6.3.10) **Addition**

Radially split casings shall have confined solid metal, or confined spiral wound gaskets.

(6.3.14) **Amendment**

The phrase "internal bolting for vertical pumps" should read "internal bolting for horizontal multi-stage and vertical pumps …"

5.4 (6.4) Nozzles and Miscellaneous Connections

(6.4.1) **Amendment**

All pumps shall have suction and discharge flanges of the same pressure and temperature rating.

.

5.5 (6.6) General

(6.6.5) **Addition**

Impellers shall have solid hubs.

(6.6.9) **Addition**

Shaft sleeves shall be coated with Colmonoy 6 or Stellite 6 over the seal contact area.

5.6 (6.8) Seals

(6.8.1) **Addition**

The pump Contractor shall be responsible for the engineering and installation of the mechanical seal and its ancillary equipment.

(6.8.4) **Addition**

As a minimum requirement, the seal end plates shall be of the same material as the pump casing. Carbon steel gland plates shall be supplied with ductile iron pump casings (if approved by Company). Any special material requirements will be specified on the pump data sheet.

(6.8.5) **Addition**

When recirculation to seal from pump discharge is required API Plan I shall not be used.

All vertical pumps with mechanical seals shall be equipped with a vent connection and valve at the highest point of the seal space.

(6.8.9) **Addition**

Seal cages shall be equipped with tapped holes or other means to facilitate their removal. Pumps handling liquids containing abrasives shall have provision(s) for injection of a flushing liquid.

.

(6.8.12) **Amendment**

Two complete sets of pump packing shall be provided for each pump and shall be packaged separately for installation in the field.

5.7 (6.9) Dynamics

(6.9.1.2) **Addition**

Single stage overhung horizontal pumps shall preferably be of stiff shaft construction with torsional and lateral critical speeds at least 20% above the maximum pump operating speed.

(6.9.2.2) **Amendment (second sentence)**

The assembled rotor(s) shall be dynamically balanced.

Addition

Balancing shall be generally in accordance with the requirements of ISO 1940, Grade 6.3 (or equivalent)

(6.9.2.5) **Amendment**

During shop testing of all anti-friction bearing pumps, operating at any speed, the maximum allowable unfiltered RMS vibration velocity, measured on the bearing housing, shall not exceed 5mm/s over the operating range from 50 per cent to 110 per cent of rated capacity.

(6.9.2.6) **Amendment**

During shop testing of all hydrodynamic bearing pumps the maximum allowable unfiltered RMS vibration velocity, measured on the shaft, and shall not exceed 7.5mm /s over the operating range from 50 per cent to 110 per cent of rated capacity. In addition

.

the maximum allowable unfiltered double amplitude of vibration (including shaft run-out) shall not exceed the following limits:

Speed (r/min.)	**Double Amplitude of Vibration (Micrometers)**
Below 1000	80
1000-4500	65
4501-6000	50
Over 6000	40

5.8 (6.10) Bearings and Bearing Housings

(6.10.1.2) **Amendment (third sentence)**

The thrust collar shall be replaceable, unless otherwise specified, and shall be positively locked to the shaft to prevent fretting.

(6.10.2.2) **Amendment (second sentence)**

The thrust bearings of vertical pumps, other than close-coupled, vertical in-line units, shall preferably be integral with the pump. The paragraphs under 2.9.1 that relate to thrust bearings and housings shall apply.

5.9 (6.11) Lubrication

(6.11) **Addition**

The pressure lubrication system shall be in accordance with the requirements of API 614 (where applicable).

.

5.10 (6.122) Materials

(6.12.1.1&6.12.1.2) **Amendment**

Materials for pump parts shall be in accordance with those listed in Appendix E.

The Contractor may propose equivalent or superior alternatives if, based on his experience, these would render equal or better service.

Supplementary acceptance criteria required by the Company for individual components of the pump(s) shall be as specified in the purchase requisition and attachments.

(6.12.1.6) **Addition**

Cast Iron shall not be used for pressure containing parts without prior approval by the Company.

(6.12.1.8) **Amendment**

The Contractor shall provide material certificates giving chemical composition and mechanical data for pressure - containing parts and all main components of the pump.

5.11 (7.1) Drivers

Unless otherwise approved drivers for pumps shall be mounted in the pump Contractor's works, aligned and match marked.
All electrical components, including electric motor drivers, shall be supplied in accordance with the requirements of the Project Specification for Electrical motors
Electrical motors shall be suitable for operation on variable speeds.
Also please refer electrical design basis.

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5.12 (7.3) Couplings and Guards

(3.2.7) **Amendment (first sentence)**

Couplings on pumps operating at speeds above 4000 rpm shall be dynamically balanced in accordance with ISO 1940 (or equivalent).

(7.3.13) **Addition**

Coupling guards shall meet all codes designated herein and any Government Statutory Requirements and shall be designed to permit ease of installation and removal. Coupling guards shall be constructed of non-sparking material. (Brass or equal, Aluminum is not permitted).

5.13 (3.4) Piping and Appurtenances

(7.5.12) **Addition**

All ancillary pipe work and valves supplied with the pump(s) shall comply with the requirements of the Project Specification for Piping Design and Materials, unless otherwise approved.
Instrumentation shall conform to the requirements of the relevant sections of the Project Specification for Instrumentation for Packaged Equipment.

5.14 (8.0) Inspection and Tests

(8.1) **General**

(8.3.2.1) **Addition**

Each individual pump of a series of identical units shall be inspected and tested. Random inspection and testing is not permitted.

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(8.3.2.1) **Inspection and Tests**

(8.3.2.3) **Addition**

All hydrostatic tests shall be carried out before any painting or preparation for painting is done.

(8.3.3.2) **Amendment (second sentence)**

The hydrostatic test shall be considered satisfactory when no casing or casing joint seepage or leaks are observed for a minimum of 60 minutes.

(8.3.3.3) **Amendment**

The Contractor shall operate the pump in the shop for a minimum of 4 hours with a period at rated point of at least 1 hour. The test shall comprise at least five points of complete test data, including head, capacity and power with vibration measurements taken in accordance with paragraph 2.8.2.2. The data points shall normally be at shut off (zero flow), minimum continuous stable flow, midway between minimum and rated flows, rated flow and 110 per cent of rated flow.

(8.3.4.3) **Addition**

Test data shall be corrected for the speed, viscosity and specific gravity conditions specified on the data sheet, where appropriate.

(8.3.4.3) **Amendment (first sentence)**

NPSHR data shall be taken at four points as defined in 4.3.3.1 (excluding shut off) and presented as a curve on the test curves.

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(8.3.4.5) **Amendment (first sentence)**

For multistage pumps, or other specified critical service units, a 1 percent drop in head shall determine the NPSH required.

Addition

No plus tolerance on NPSH required shall be permitted at the rated flow point.

(8.4) **Preparation for Shipment**

(8.4.1) **Amendment**

After completion of all inspection and testing requirements, the equipment shall be prepared and painted in accordance with the requirements of the Project Specification for Painting and Protective Coatings.

Additionally pump internals shall be drained and dried.

5.15 (10.3) Contractor Documents

Addition

The Contractor shall, in addition, furnish drawings and data in accordance with the requirements of the Company's procurement documentation.

6.0 INSPECTION & TESTS

6.1 General

1) In addition to inspections and tests performed by the Contractor and Manufacturer, all equipment shall be subject to inspection by Company prior to shipment. Inspection shall include verification of equipment dimensions, examination of the test data and checking preparation for shipment.

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2) The Contractor shall submit an inspection and testing procedure for review and approval by Company.

3) The Performance Test report to be provided by the Contractor.

4) All pumps shall be inspected and tested in accordance with API Standard 610, Section 4, Inspection, testing and preparation for shipment.

5) The vibration data of pump unit to be taken during Performance Test of the package at rated speed and full capacity. Contractor to submit vibration data record along with complete spectrum trend.

6) Certified reports on in-plant tests run on the pump shall be submitted to the Company, by the Contractor for approval prior to shipment of the pumps.

7) The Company before consignment to the work-site may carry out a final inspection, the manufacturer shall carry out the test including alignment works in the specified ambient temperature conditions as specified.

6.2 Material Inspection

The Contractor shall provide the certification of materials such as mill test reports, for review of the Company. Material test reports shall demonstrate the compliance of the material specifications. Any non-compliance, not previously approved by the Company, shall be at the risk of the Contractor.

Radiographic, ultrasonic, magnetic particle or liquid penetrant inspection of weld or material shall comply with section 4.2.2 of API Standard 610.

6.3 Mechanical Inspection

Company may inspect the equipment and all piping and appurtenances before assembly. Hardness of parts, welds and heat-affected zones shall be verified, as being within the allowable values, by testing. Results shall be submitted to the Company.

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Mechanical inspection by Company shall comply with Section 7.0 of API Std 610, Latest Edition.

6.4 Hydrostatic Test

All pressure casing components shall be Hydrostatical Tested according to the API Standard 610, Section 7.3.23 requirements, latest Edition.

Each pump shall be subjected to a 1 hour hydrostatic test at a minimum 1.5 times the maximum allowable working pressure

6.4a Capacity Testing

To demonstrate the rated capacity at the rated discharge head.

6.5 Performance Test

6.5.1 This test shall be according to the relevant conditions stated in API Standard 610, latest edition section 7.3.3. All the pumps shall be hydrostatic tested in the factory.

6.5.2 Complete Unit Test

This test shall be according to section 7.3.4.3 of API Standard 610.

The complete alignment of the motor pump unit shall be ensured at the time of setting up by the Pump Manufacturer, assisted by the competent and responsible staff of the motor Contractor.

The tests shall be run in the presence of the Company and approved representatives of the pump and motor manufacturer. An advance notice of four weeks prior to performance and unit tests shall be given to the Company.

6.6 Sound Level Test

Test shall be performed according to section 7.3.4.4 of API Standard 610.

6.7 NPSHR Test

Test shall comply with section 7.3.4.2 of API Standard 610.

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6.8 Auxiliary Equipment test.

Auxiliary system including control system shall be tested in Pump Manufacturer's shop.

6.9 Bearing Housing resonance Test

Bearing housing resonance test shall be carried out in accordance with the requirement of section 7.3.4.6 of API 610.

7.0 MARKING

A nameplate of Stainless steel material shall be permanently affixed to the each pump. The marking for the motor shall contain the minimum data specified in the motor specification. The pump name plate shall be stamped with the following information, in units consistent with the data sheet.

7.1 Name Plate Data

- Company's item/Tag number
- Name of Vendor with Country of origin
- Vendors size and model number
- Pump model number
- Month/Year of Manufacturing
- Rated flow
- Rated head
- Manufacturer's bearing identification numbers (if Applicable)
- Casing Hydrostatic head pressure
- Speed
- Maximum Allowable working pressure (MAWP)
- .Pump head/Discharge Pressure

.

- Temperature Basis for MAWP

In addition to being stamped on the nameplate, the pump number shall be permanently marked on the pump casing.

Rotation arrows shall be cast in or attached on each major item of rotating equipment at readily visible location.

8.0 SURFACE PREPARATION & PAINTING

Internal and external surfaces shall be cleaned to remove all scale, rust, grease, dirt, weld spatter and foreign objects. The painting shall be under taken only when all the tests have been performed and accepted.

The painting will consists of:

- Careful cleaning and degreasing.
- The painting will consists of appropriate coating system, which shall be specified by Pump Manufacturer.
- Color shall be according to the General Specification for Painting 0221-PA-2002.

9.0 DELIVERY

9.1 Preparation for Shipping

- Each pump and its component shall be shipped in the same consignment.
- All openings such as nozzles, vents and field connections shall be properly sealed to avoid entrance of foreign particles and protected during shipment.

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- All fragile items shall be removed and crated in rigid packing crates with sufficient padding to prevent damage during shipment and shall be properly tagged for ease of field installation.
- The Contractor shall provide corrosion protection for all internal and external machine parts for sea shipment and six months outdoor storage and which can be easily removable at site.
- The water-tested parts, which are likely to contain residual water shall be properly drained and dried, so that the damage of the same by freezing during transportation and storage can be avoided.
- Thread opening shall be provided with steel caps or steel plugs.
- Lifting points and lifting lugs shall be clearly identified.
- Exposed shafts and shaft couplings shall be wrapped with water proof, malleable waxed cloth or volatile corrosion inhibitor paper. The seams shall be sealed with oil proof adhesive tape.
- Bearing assemblies shall be fully protected from the entry of moisture and dirt.
- One copy of the manufacturer's standard installation manual shall be packed and shipped with the equipment

.

9.2 Operating and Maintenance Manuals

- Five (5) sets of operating and maintenance manuals from the original equipment manual shall be provided to enable the Company to install, operate and maintain the complete equipment ordered.
- Contractor's list shall show original manufacturer and local representative name, address and phone number for each item not manufactured by Contractor.
- The information and material supplied shall pertain directly to the unit purchased. Generalized or typical material shall not be included.

9.3 Spare Parts

The bidder shall submit a priced list of recommended two years spare parts (optional) with his commercial proposal. This list shall include original manufacturer and local representative name, address and phone number for each item.

9.4 Guarantee and Warranty

The Contractor will warrant the equipment to be free of defects in material and workmanship, and that it is of adequate size and capability to fulfill the design and operating conditions specified herein. The Contractor shall replace and install, without cost to the Company, any materials, supplies, or equipment which fails or under performs under design conditions due to defects in material or workmanship improper sizing, if the defect is observed and/or such failure occurs within eighteen (18) months from the date such equipment or one (1) year from the date material is put in operation or commissioning, whichever is less. Acceptance of this order will signify acceptance of all conditions of this guarantee.

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10.0 DOCUMENTATION

The Contractor shall provide documentation in accordance with API Standard 610. The Contractor shall submit at least the following details on the pumps and its auxiliary systems with the proposal. All additional documentation required by this specification of necessary for the satisfactory performance of the job shall also be provided by the Contractor.

1) Name of pump manufacturer and country of manufacturing.
2) Cross sectional/dimensional drawings
3) Performance curves.
4) List of recommended spare parts, etc.
5) Data sheet according to API 610 dully filled

The Contractor shall submit the following details on the pumps and its auxiliary system with the bid:

a) Name of pump manufacturer and country of manufacturing and evidence of API monogram.
b) Outline drawings.
c) Load of the equipment to facilitate the civil foundation design.
d) Cross Sectional Drawings.
e) Shaft Seal Drawing
f) Shaft coupling assembly drawing with details of allowable misalignment tolerances style of coupling guard. Materials and names of the mechanical seal and coupling manufacturer.
g) Primary and auxiliary sealing schematic.
h) Cooling schematic.
i) Lube oil schematic

.

j) Lube oil system arrangement drawing including sizes and, ratings.

k) Lube oil component drawings and data.

l) Electrical and instrumentation schematics and list of components

m) Performance curves.

n) Materials

o) Noise levels

p) List of recommended Spare parts.

q) Dimensional drawing of motor.

r) Name of motor manufacturer and country of manufacturing

s) Motor performance data.

t) Motor hazardous area classification.

u) Motor start details

v) Installed weight of each skid, dry and operating.

w) Recommended method for starting motor driven pump.

The contractor shall submit in writing that pumps manufactured and installed by it are working successfully in similar services for a minimum of 03 years on at least 02 locations.

For vertical sump pumps, contractor shall state the minimum submergence required and the minimum clearance from the sump bottom in its proposal. Details of, and the proposed vendor of all items which are not part of Contractor's own manufacture, and any intent to use suppliers of vendor to partly or wholly manufacture any part of the equipment or its ancillaries shall be disclosed to the Company in the bid. This requirement does not apply to standard fasteners and bulk items such as pipe and pipe fittings.

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After the placement of the order, the Contractor shall not substitute any of the agreed suppliers without the Company's prior approval.

Vertical pumps taking suction from sump/vessel shall be furnished with corrosion resistant suction strainer. Perforation / mesh size shall be suitable for proper operation of pump. Free flow area of strainer shall be minimum 2.5 times the area of equivalent suction nozzle area.

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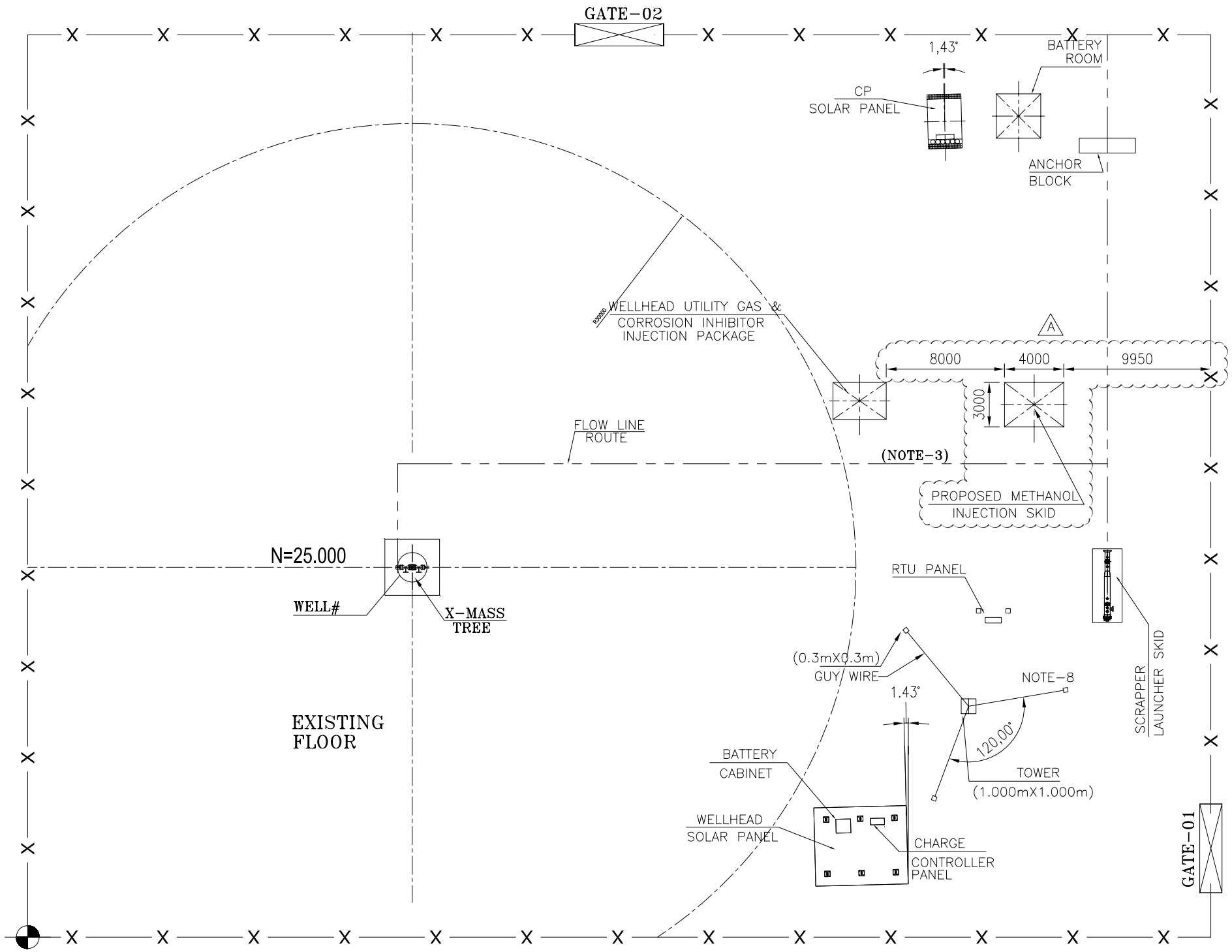
REFERENCE DRAWING	
DISCRIPTION	DWG. NO
PIPINGLAYOUT (WELL HEAD NO.27 EASTERN LOBE)	4985-PD-2300-12



NOTE 06		
S.No.	WELL#	PREFIX XXXX
1.	UCH-7	07
2.	UCH-8	08
3.	UCH-9	09
4.	UCH-28/6B	6B
5.	UCH-19	19
6.	UCH-27	27
7.	UCH-32	32
8.	UCH-D1B	D1B

A

LEGENDS:-

FENCE : ——— X ——— X ——— X ———

FLOW LINE : _____ — — _____

SCOPE UNDER PROJECT # 14-0221 :

NOTES:-

1. ALL DIMENSIONS ARE IN mm UNLESS OTHER WISE SPECIFIED.
2. FACILITY FINISHED GRADE LEVEL IS 55.210M.(EXCLUDING CELLAR PAD/FLOOR) FINALIZED BASED ON SURVEY DATA.
3. PREVAILING WIND DIRECTION IS WINTER-WEST TOWARD EAST SUMMER - SOUTH TOWARD NORTH.
4. PLOT PLAN DIMENSION IS TAKEN AS 80M (262')x 61M (200')
5. PANEL ROOM FOR HYDRAULIC PANEL.
6. THIS PLOT PLAN IS TYPICAL FOR ALL MENTIONED WELLHEADS THE TOTAL NO. OF SKIDS REQUIRED ARE EIGHT (08) FURTHER, XX PREFIX DENOTES WELL #.
7. PROPOSED METHANOL INJECTION SIZE AND LOCATION IS INDICATIVE & TENTATIVE AND SHALL BE FINALIZED BY EPCC CONTRACTOR DURING DETAILED ENGINEERING AND SUBMIT FOR REVIEW & APPROVAL.

A

ISSUED FOR IDC

REV.	DATE	DESCRIPTION OF REVISION	DRAWN	DESIGNED	CHECKED	APPR.
A	02-05-2019	ISSUED FOR IDC	KI	MA	SFA	FS

ENAR PETROTECH SERVICES (PRIVATE) LIMITED
7-B, Sector 7-A Korangi Industrial Area, Karachi Pakistan
TEL: (9221) 5062791 E-mail: info@enar.com.pk
URL: www.enar.com.pk

OIL & GAS DEVELOPMENT PROJECT

UCH COMPRESSTION PROJECT

TITLE:

TYPICAL PLOT PLAN
WELL HEADS NOs. 01B, 6B, 7, 8 , 9, 19, 27 & 32

Job No. 14-0221

Dwg. No. 0221-PC-2201

COMPUTER CODE	0221-PC-2201-A
SHEET SIZE	A3
SCALE	1:350
REPLACES DWG. NO.	-

Job No. **14 – 4985**	
Spec. No. **4985-PA-2002a**	
Page **1** of **19**	Rev. **0**

SPECIFICATION FOR PIPING MATERIAL DESIGN

Project: **UCH-II Development Project**

Client: **Oil & Gas Development Company Limited**

Prepared by: **MTZ**
Checked by: **MHQ**
Approved by: **FS**
Revised by: **-**

Rev.	Description of Revision	Date	Revised Page Nos.
0	ISSUED FOR BIDDING	October 5, 2011	

TABLE OF CONTENTS

1.0 SCOPE

This specification covers the selection of commodity piping materials to be used in design, fabrication and installation of the gas gathering system and the liquid handling facilities plant for Oil & Gas Development Company's (OGDC) UCH-II Development Project.

2.0 MATERIALS

Materials for use in sour gas piping systems shall meet all the requirements of NACE MR0175 / ISO 15156. It is imperative that all materials selected and purchased for use in sour gas systems are resistant to sulfide-stress cracking (SSC). Hydrogen-induced cracking (HIC), and stress-oriented hydrogen induced cracking (SOHIC). For carbon steel materials, hardness control in manufacture is extremely critical.

Materials manufactured from carbon steels that do not meet the NACE requirements are satisfactory for utility air and instrument air system services.

3.0 SPECIFICATION NUMBERING

3.1 Piping Material

The two digits piping material design specifications are coded as follows:

First Digit:	**Base Material**
A.	Carbon Steel
B.	Stainless Steel

Second Digit:	**Design Pressure and Service**
Design Pressure	**Service**
1 150 psig	Air, Nitrogen or Water
2 150 psig	Sour Gas or Liquid
4 1,050 psig	Sour Gas or Liquid
5 1,250 psig	Sour Gas or Liquid
6 1,340 psig	Sour Gas or Liquid

3.2 Valve Designations

A five digit code is provided for each valve coded as follows:

First digit:	Valve type
Second digit	Pressure Rating
Third digit:	Material
Forth and Fifth digits:	End Type

Valve Type	Pressure Rating	Material	End Type
B = Ball	1 = ANSI 150#	C = Carbon Steel	SW = Socket Weld
D = Instrument Manifold	2 = ANSI 300#	S = Stainless Steel	SC = Screwed
C = Check	3 = ANSI 600#	B = Carbon body	BW = Butt weld
G = Gate	4 = ANSI 900#	Alloy Internals	FR = RF Flanged
	7 = 3000 # CWP		FX = RJ Flanged
			ST = SW x SC

4.0 SPECIFICATIONS

Piping material design specifications for the UCH II Development Project are as under:

SPECIFICATION A1

Spec.	Service	Design Pressure	Design Temperature
A1	Instrument Air, Utility Air, fire Water, Low Pressure Nitrogen	150 Psig	30 to 150 ºF

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.50	250 Psig	335 Psig

Pipe:

Size	Material	Schedule
2" - Smaller	API 5L GR B / A – 53 Gr. B	80
3" – 12"	API 5L GR B / A – 53 Gr. B	STD

Flanges:

Size	Pressure Rating	Material	Type	Schedule
¾" – 1½"	ANSI 150#	ASTM A105	Socket Weld Raised Face	160
2"	ANSI 150#	ASTM A105	Weld Neck Raised Face	80
3" – 12"	ANSI 150#	ASTM A105	Weld Neck Raised Face	STD

Weld Fittings:

Size	Standard	Material	Schedule
¾" – 1½"	B16.11	A-105	3000#
2"	B16.9	A234 WPB	80
3" – 12"	B16.9	A234 WPB	STD

Valves:

Code Designation	Valve Type	Size Range in Inches	Pressure Rating	End Connection	Operation
B7SSW	Ball	½ - 1½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1½	3000# CWP	SW x Thread	Wrench
B1CFR	Ball	2 – 3	ANSI 150#	RF Flanged	Wrench
B1CFR	Ball	4	ANSI 150#	RF Flanged	Wrench
B1CFR	Ball	6 and above	ANSI 150#	RF Flanged	Hand wheel
C7SSC	Check	1- 1½	3000# CWP or 3600 WOG	Threaded Weld	Swing
C7SSW	Check	1- 1½	3000# CWP	Socket Weld	Swing
C1CFR	Check	2 and above	ANSI 150#	RF Flanged	Swing

All valves must be designed and manufactured in accordance with ASME B 16.34 All valves must meet the material requirements of NACE MR0175 / ISO 15156. 2" and larger check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Branch Chart: A1

	Header																	
Branch	**3/4**	**1**	**2**	**3**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**
¾	T	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
1		T	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
2			T	T	O	O	O	O	O	O	O	O	O	O	O	O	O	O
3				T	T	T	O	O	O	O	O	O	O	O	O	O	O	O
4					T	T	T	O	O	O	O	O	O	O	O	O	O	O
6						T	T	T	O	O	O	O	O	O	O	O	O	O
8							T	T	T	T	O	O	O	O	O	O	O	O
10								T	T	T	T	O	O	O	O	O	O	O
12									T	T	T	T	O	O	O	O	O	O
14										T	T	T	T	O	O	O	O	O
16											T	T	T	O	O	O	O	O
18												T	T	T	T	T	T	O
20													T	T	T	T	T	O
22														T	T	T	T	O
24															T	T	T	T
26																T	T	T
28																	T	T

T = Tee, Reducing Tee or Extruded Header

O = Olet

GASKETS

All gaskets shall be 1/8" Flexitallic Style CGI Spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek insulating gasket with a 316L SS retainer and bolt sleeves shall be used in place of a Flexitallic gasket. All gaskets shall be manufactured in accordance with ANSI B16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -193, Grade B7M with fluro-polymer coating. All hex nuts provided with these bolts shall be ASTM A -194, Grade 2HM with fluro-polymer coating.

TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

SPECIFICATION A2

All pipe, valves and fittings must meet the material requirements of NACE MR0175 / ISO 15156.

Spec.	Service	Design Pressure	Design Temperature
A2	L.P. Fuel Gas Flare, Condensate, Produced Water	150 Psig	30 to 150 ºF

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.5	250 Psig	335 Psig

Pipe:

Size	Material	Schedule
2" & Smaller	API 5L GR B / A 106 Gr. B	80
3" – 12"	API 5L GR B/ A 106 Gr. B	STD
16" – 24"	API 5L GR B/ A 106 Gr. B	STD
30"	API 5L GR B	STD

Flanges:

Size	Pressure Rating	Material	Type	Schedule
¾" - 1½"	ANSI B16.5 300#	ASTM 105	Socket Weld Raised Face	160
2"	ANSI B16.5 300#	ASTM 105	Weld Neck Raised Face	80
3"	ANSI B16.5 300#	ASTM 105	Weld Neck Raised Face	STD
4" – 12"	ANSI B16.5 150#	ASTM 105	Weld Neck Raised Face	STD
16" – 24"	ANSI B16.5 150#	ASTM 105	Weld Neck Raised Face	STD
30"	MSS SP 44 150#	ASTM 105	Weld Neck Raised Face	STD

Weld Fittings:

Size	Standard	Material	Schedule
¾" – 1½"	B16.11	ASTM A-105	3000#
2"	B16.9	A234 WPB	80
3" – 12"	B16.9	A234 WPB	STD
16" – 24"	MSS SP 75	A234 WPB	STD
30"	MSS SP 75	A234 WPB	STD

Valves:

Code Designation	Valve Type	Size Range in Inches	Pressure Rating	End Connection	Operation
B7SSW	Ball	½ - 1½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1½	3000# CWP	SW x Thread	Wrench
B2SFR	Ball	2 – 3	ANSI 300#	RF Flanged	Wrench
B1BFR	Ball	4	ANSI 150#	RF Flanged	Wrench
B1BFR	Ball	6 and above	ANSI 150#	RF Flanged	Hand wheel
C7SSW	Check	1-1½	3000# CWP	Socket Weld	Swing
C2BFR	Check	2 – 3	ANSI 300#	RF Flanged	Swing
C1BFR	Check	4 and above	ANSI 150#	RF Flanged	Swing

Alt valves must be designed and manufactured In accordance with ASME B 16.34. All valves must meet the material requirements of NACE MR0175 / ISO 15156. 2" and larger check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Branch Chart: A2

	Header																
Branch	**3/4**	**1**	**2**	**3**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**
¾	T	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
1		T	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
2			T	T	O	O	O	O	O	O	O	O	O	O	O	O	O
3				T	T	T	O	O	O	O	O	O	O	O	O	O	O
4					T	T	T	O	O	O	O	O	O	O	O	O	O
6						T	T	T	O	O	O	O	O	O	O	O	O
8							T	T	T	T	O	O	O	O	O	O	O
10								T	T	T	T	O	O	O	O	O	O
12									T	T	T	T	O	O	O	O	O
14										T	T	T	T	O	O	O	O
16											T	T	T	O	O	O	O
18												T	T	T	T	T	O
20													T	T	T	T	O
22														T	T	T	O
24															T	T	T
26																T	T
28																	T

T = Tee. Reducing Tee or
Extruded Header O = Olet

GASKETS

All gaskets shall be 1/8" Flexitallic Style CGI spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the

flange connections Involve connection of a stainless steel flange to a carbon steel flange, a Pikotek insulating gasket with a 316L SS retainer and bolt sleeves shall be used in place of a Flexitallic gasket. All gaskets shall be manufactured in accordance with ANSI B16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -193. Grade B7M with fluro-polymer coating. All hex nuts provided with these bolts shall be ASTM A -194. Grade 2HM with fluro-polymer coating.

TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

SPECIFICATION A4

All pipe, valves and fittings must meet the material requirements of NACE MR0175 / ISO 15156.

Spec.	Service	Design Pressure	Design Temperature
A4	H.P. Plant Gas Piping	1050 Psig	30 to 150 ºF

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.50	1,600 Psig	2,160 Psig

Pipe:

Grade	Material	Size	Schedule
GRB	API 5L / A 106 Gr. B	8" Smaller	XS
X65	API 5L	36"	0.750" Wall

Flanges:

Size	Pressure Rating	Material	Type	Schedule
¾" - 1½"	ANSI B 16.5 600#	ASTM A105	Socket Weld Raised Face	160
2" - 8"	ANSI B 16.5 600#	ASTM A105	Weld Neck Raised Face	XS
36"	MSS SP 44 600#	ASTM A105	Weld Neck Raised Face	0.750" Wall

Weld Fittings:

Size	Standard	Material	Schedule
¾" - 1½"	B16.11	A-105	3000#
2" – 8"	B16.9	A234 WPB	XS
36"	MSS SP 75	A234 WPY65	0.750" Wall

Valves:

Code Designation	Valve Type	Size Range in Inches	Design Pressure	End Connection	Operation
B7SSW	Ball	½ - 1½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1½	3000# CWP	SW x Thread	Wrench
B3SFR	Ball	2 – 3	ANSI 600#	RF Flanged	Wrench
B3BFR	Ball	4	ANSI 600#	RF Flanged	Wrench
B3BFR	Ball	6 and above	ANSI 600#	RF Flanged	Hand wheel
C7SSW	Check	1½ and Below	3000#	Socket Weld	Swing
C3SFR	Check	2 – 3	ANSI 600#	RF Flanged	Swing
C3BFR	Check	4 and above	ANSI 600#	RF Flanged	Swing

All valves must be designed and manufactured in accordance with ASME B 16.34. All valves must meet the material requirements of NACE MR0175 / ISO 15156. Check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Smoothly contoured tees, shall be used for all branch connections where the branch size is 2-Inch or larger. Smoothly contoured tees are always preferred for branch connections where practical. For small branch connections for Instrumentation and sampling, weldolets may be used for sizes smaller than 2" so long as the branch to header diameter ratio is 50% or less. No threadolets or elbolets shall be used.

GASKETS

All gaskets shall be 1/8" Flexitallic Style CGI spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek insulating gasket with a 316L SS retainer and bolt sleeves, shall be used in place of a Flexitallic gasket all gaskets shall be manufactured in accordance with ANSI B 16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -193, Grade B7M with fluro-polymer coating. All hex nuts provided with these bolts shall be ASTM A -194, Grade 2HM with fluro-polymer coating.

TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

SPECIFICATION A5

All pipes must meet the material requirements of NACE MR0175 / ISO 15156

Spec.	Service	Design Pressure	Design Temperature
A5	Gas Flow Line Pipe	1,250 Psig	30 to 150 ºF

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.72	1,900 Psig	2,160 Psig

Pipe:

Size	Material	Schedule
8”- 12”	API 5LX52	STD

SPECIFICATION A6

All pipe, valves and fittings must meet the material requirements of NACE MR0175 / ISO 15156

Spec.	Service	Design Pressure	Design Temperature
A6	Well Head Gas, Launchers and Receivers Gas, H.P. Plant Gas Piping.	1,250 Psig	30 to 150 ºF

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.50	1,900 Psig	2,160 Psig

Pipe:

Size	Material	Grade	Schedule
6” Smaller	API 5L / A 106 Gr. B	GRB	XS
8”-12”	API 5L / A 106 Gr. B	X.52”	XS
30”	API 5L	X.65	0.750” wall

Flanges:

Size	Pressure Rating	Material	Type	Schedule
¾” - 1½”	ANSI B16.5 600#	ASTM A105	Socket Weld Raised Face	160
2”-12”	ANSI B16.5 600#	ASTM A105	Weld Neck Raised Face	XS
30”	MSS SP 44 600#	ASTM A105	Weld Neck Raised Face	0.750” wall

Weld Fittings:

Size	Standard	Material	Schedule
¾” - 1½”	B16.11	ASTM A-105	3000#
2” – 12”	B16.9	ASTM A234 WPY52	XS
30”	MSS SP 75	ASTM A234 WPY65	0.750” wall

Valves:

Code Designation	Valve Type	Size Range in Inches	Design Pressure	End Connection	Operation
B7SSW	Ball	½ - 1½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1½	3000# CWP	SW x Thread	Wrench
B3SFR	Ball	2 – 3	ANSI 600#	RF Flanged	Wrench
B3BFR	Ball	4	ANSI 600#	RF Flanged	Wrench
B3BFR	Ball	6 and above	ANSI 600#	RF Flanged	Hand wheel
C7SSW	Check	1½ and Below	3000#	Socket Weld	Swing
C3SFR	Check	2 – 3	ANSI 600#	RF Flanged	Swing
C3BFR	Check	4 and above	ANSI 600#	RF Flanged	Swing

All valves must be designed and manufactured in accordance with ASME B 16.34. All valves must meet the material requirements of NACE MR0175 / ISO 15156. Check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Smoothly contoured tees shall be used for all branch connections where the branch size is 2-inch or larger. Smoothly contoured tees are always preferred for branch connections where practical. For small branch connections for instrumentation and sampling, weldolets may be used for sizes smaller than 2” so long as the branch to header diameter ratio is 50% or less. No thredolets or elbolets shall be used.

GASKETS

All gaskets shall be 1/8" Flexitallic Style CGI spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek insulating gasket with a 316L SS retainer and bolt sleeves-shall be used in place of a Flexitallic gasket. All gaskets shall be manufactured in accordance with ANSI B16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -193. Grade B7M with fluro-polymer coating. All hex nuts provided with these bolts shall be ASTM A -194. Grade 2HM with fluro-polymer coating.

TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

SPECIFICATION B4

All pipe, valves and fittings must meet the material requirements of NACE MR0175 / ISO 15156

Spec.	Service	Design Pressure	Design Temperature
B4	H.P Gas Piping	1,050 Psig	30 to 150 ºF

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.50	1,600 Psig	2,160 Psig

Pipe:

Size	Material	Schedule
1½" Smaller	A – 312 TP / 316L SS	80 S
2"- 18"	316L SS	80 S

Flanges:

Size	Pressure Rating	Material	Type	Schedule
1½" Smaller	ANSI B16.5 600#	A – 182 Gr. F / 316L Dual Stamped 316	Socket Weld Raised Face	80 S
2"-6"	ANSI B16.5 600#	A – 182 Gr. F / 316L Dual Stamped 316	Weld Neck Raised Face	80 S
18"	MSS SP 44 600#	A – 182 Gr. F / 316L Dual Stamped 316	Weld Neck Raised Face	80 S

Weld Fittings:

Size	Standard	Material	Schedule
1½" Smaller	B16.11	A-182 F-316L SS	6000#
2" – 6"	B16.9	A-403 WP-316L SS	80 S
8" – 18"	MSS SP 75	A-403 WP-316L SS	80 S

Valves:

Code Designation	Valve Type	Size Range in Inches	Design Pressure	End Connection	Operation
B7SSW	Ball	½ - 1½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1½	3000# CWP	SW x Thread	Wrench
B3SFR	Ball	2 – 4	ANSI 600#	RF Flanged	Wrench
B3SFR	Ball	6 and above	ANSI 600#	RF Flanged	Hand wheel
C7SSW	Check	½ -1½	3000# CWP	Socket Weld	Swing
C3SFR	Check	2 and above	ANSI 600#	RF Flanged	Swing

All valves must be designed and manufactured in accordance with ASME B 16.34. All valves must meet the material requirements of NACE MR0175 / ISO 15156. 2" and larger check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Smoothly contoured tees shall be used for all branch connections where the branch size is 2-inch or larger. Smoothly contoured tees are always preferred for branch connections where practical. For small branch connections for Instrumentation and sampling, weldolets may be used for sizes smaller than 2" so long as the branch to header diameter ratio is 50% or less. No thredolets or elbolets shall be used.

GASKETS

All gaskets shall be Flexitallic Style CGI spiral-wound gaskets. Materials of construction for the Flexitaltic gaskets shall be type 316L stainless steel with flexicarb filler. Where the flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek Flowlok insulating gasket with a 316L SS retainer and bolt sleeves shall be used in place of a Flexitallic gasket. All gaskets shall be manufactured in accordance with ANSI B16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -193. Grade B7M with fluro-polymer coating. All hex nuts provided with these bolts shall be ASTM A -194. Grade 2HM with fluro-polymer coating.

TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

SPECIFICATION B5

All pipe, valves and fittings must meet the material requirements of NACE MR0175 / ISO 15156

Spec.	Service	Design Pressure	Design Temperature
B5	H.P Gas Piping	1,250 Psig	30 to 150 ºF

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.50	1,900 Psig	2,200 Psig

Pipe:

Size	Material	Schedule
1" Smaller	A – 312 TP / 316 SS	80 S
2"-6"	A – 312 TP / 316 SS	80 S
8"-16"	A – 312 TP / 316 SS	80 S
18"	A – 312 TP / 316 SS	80 S

Flanges:

Size	Pressure Rating	Material	Type	Schedule
1½" Smaller	ANSI B16.5 600#	A-182 Gr. F / 316L Dual Stamped 316	Socket Weld Raised Face	80 S
2"- 16"	ANSI B16. 600#	316L Dual Stamped 316	Weld Neck Raised Face	80 S
18"	MSS SP 44 600#	316L Dual Stamped 316	Weld Neck Raised Face	80 S

Weld Fittings:

Size	Standard	Material	Schedule
1½"- Smaller	B16.11	A-182 F-316L SS	3000#
2" – 6"	B16.9	A-403 WP-316L SS	80 S
8" – 12"	B16.9	A-403 WP-316L SS	80 S
16"	MSS SP 75	A-403 WP-316L SS	80 S

Valves:

Code Designation	Valve Type	Size Range in Inches	Pressure Rating	End Connection	Operation
B7SSW	Ball	½ - 1½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1½	3000# CWP	SW x Thread	Wrench
B3SFR	Ball	2 – 4	ANSI 600#	RF Flanged	Wrench
B3SFR	Ball	6 and above	ANSI 600#	RF Flanged	Hand wheel
C7SSC	Check	1 -1½	3000# CWP or 3600 WOG	Threaded	Swing
C7SSW	Check	½ - 1½	3000# CWP	Socket Weld	Swing
C3SFR	Check	2 and above	ANSI 600#	RF Flanged	Swing

All valves must be designed and manufactured in accordance with ASME B 16.34. All valves must meet the material requirements of NACE MR0175 / ISO 15156, 2" and larger check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Smoothly contoured tees shall be used for all branch connections where the branch size is 2-inch or larger. Smoothly contoured tees are always preferred for branch connections where practical. For small branch connections for instrumentation and sampling, weldolets and sockolets may be used for sizes smaller than 2" so long as the branch to header diameter ratio is 50% or less. No threadolets or elbolets shall be used.

GASKETS

All gaskets shall be Flexitallic Style CGI spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek

Flow lock insulating gasket with a 316L SS retainer and bolt sleeves shall be used In place of a Flexitallic gasket. All gaskets shall be manufactured in accordance with ANSI B16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -103. Grade B7M with fluro-polymor coating. All hex nuts provided with these bolts shall be ASTM A -194, Grade 2HM with fluro-polymer coaling.

TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

SPECIFICATION B6

All pipe, valves and fittings must meet the material requirements of NACE MR0175 / ISO 15156

Spec.	Service	Design Pressure	Design Temperature
B6	Well Head Gas Piping	1,340 Psig	30 to 150 ºF

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.50	2,050 Psig	2,160 Psig

Pipe:

Size	Material	Schedule
1½”- Smaller	A-312 Gr. TP / 316L SS Dual Stamped 316	80 S
2”-6”	A-312 Gr. TP /316L SS Dual Stamped 316	80 S

Flanges:

Size	Pressure Rating	Material	Type	Schedule
1½” - Smaller	ANSI B16.5 900#	A-182 Gr. F / 316L SS	Socket Weld Raised Face	80 S
2”-6”	ANSI B16.5 900#	A-182 Gr. F / 316L SS	Weld Neck Raised Face	80 S
8” - 16”	ANSI B16.5 900#	A-182 Gr. F / 316L SS	Weld Neck Raised Face	80 S

Weld Fittings:

Size	Standard	Material	Schedule
1½” - Smaller	B16.11	A-182 F-316L SS	3000#
2” – 6”	B16.9	A-403 TP-316L SS	80

Valves:

Code Designation	Valve Type	Size Range in Inches	Pressure Rating	End Connection	Operation
B7SSW	Ball	½ - 1-½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1-½	3000# CWP	SW x Thread	Wrench
B4SFR	Ball	6 and above	ANSI 900#	RF Flanged	Hand wheel
C7SSW	Check	½ - 1-½	3000# CWP	Socket Weld	Swing

All valves must be designed and manufactured in accordance with ASME B 16.34. All valves must meet the material requirements of NACE MR0175 / ISO 15156. 2" and larger check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Smoothly contoured tees shall be used for all branch connections where the branch size is 2-inch or larger. Smoothly contoured tees are always preferred for branch connections where practical. For small branch connections for instrumentation and sampling, weldolets may be used for sizes smaller than 2" so long as the branch to header diameter ratio is 50% or less. No thredolets or elbolets shall be used.

GASKETS

All gaskets shall be Flexitallic Style CG1 spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek Flowlok insulating gasket with a 316L SS retainer and bolt sleeves shall be used in place of a Flexitallic gasket. All gaskets shall be manufactured in accordance with ANSI B16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -103, Grade B7M with fluro-polymer coating. All hex nub provided with these bolts shall be ASTM A -194. Grade 2HM witli fluro-polymer coating.

TUBING

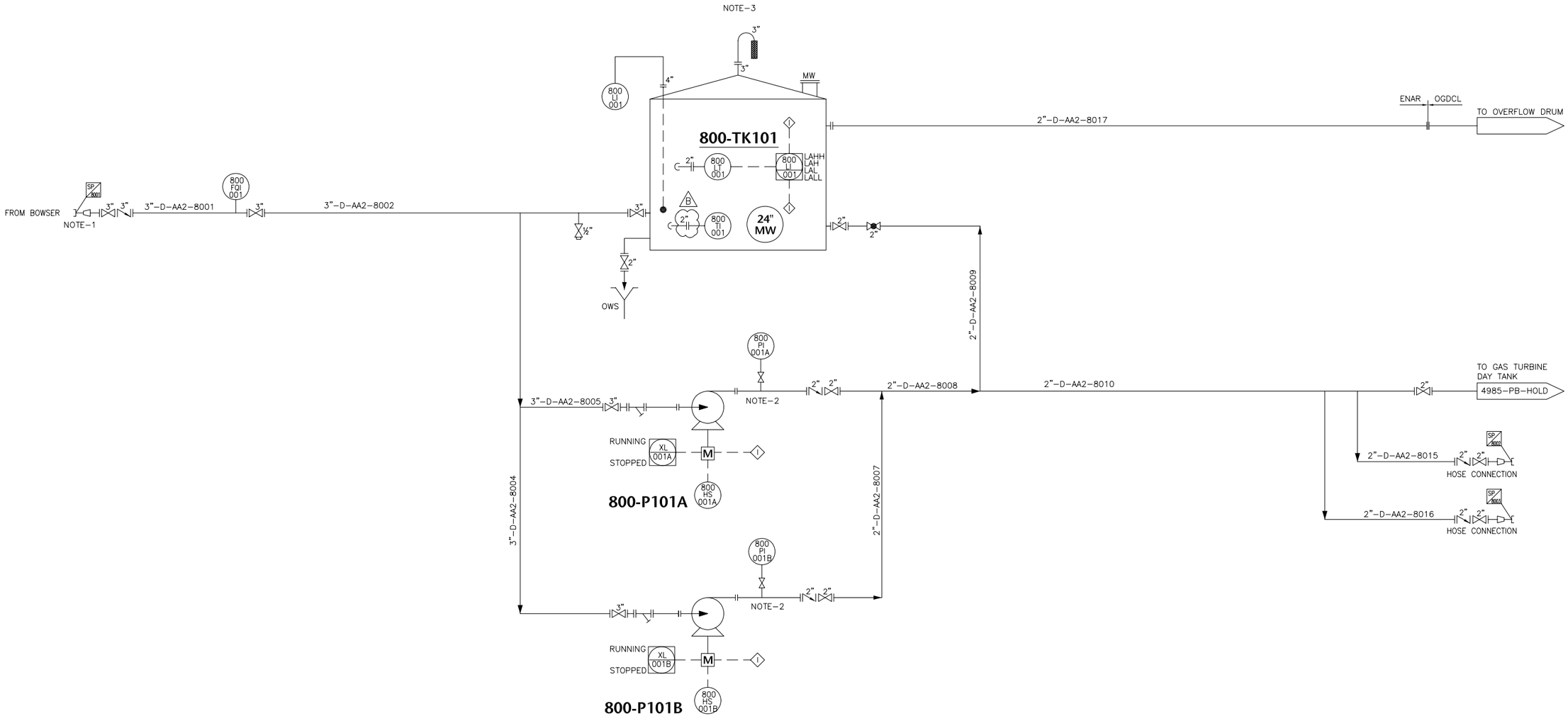
All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

800-TK101

DIESEL TANK
CAPACITY : 2000 BBL.
SIZE : 31.49' ID x 30.87' H
DESIGN PRESSURE : ATM PSIG.
DESIGN TEMPRATURE : 180 °F

800-P101A/B

DIESEL LOADING/DECANTING PUMPS
CAPACITY : 50 GPM.
DIFFERENTIAL HEAD : 102 FT.



NOTES:

1. HOSE CONNECTION FOR TANK UNLOADING.
2. PUMP DISCHARGE LINE SHALL BE DESIGNED ON PUMP SHUT OFF PRESSURE (MINIMUM) UPTO THE ISOLATION VALVE OF PUMP.
3. BIRD SCREEN.

REV.	DATE	DESCRIPTION OF REVISION	DRAWN	DESIGNED	CHECKED	APPR.
0	08-05-2013	ISSUED FOR CONSTRUCTION	KI	OIB	MAM/SAF	FS
B	24-01-2013	INTERNAL COMMENTS INCORPORATED	NA	OIB	MAM/SAF	FS
A	07-03-2012	ISSUED FOR REVIEW & APPROVAL	NA	SGM	MAM/SAF	FS

ENAR PETROTECH SERVICES (PRIVATE) LIMITED
7-B, Sector 7-A Korangi Industrial Area, Karachi Pakistan
TEL: (9221) 5062791 E-mail: info@enar.com.pk
URL:www.enar.com.pk

Job No. 14-4985

Dwg. No. 4985-PB-2217

OIL & GAS DEVELOPMENT COMPANY LTD.

UCH-II DEVELOPMENT PROJECT

TITLE: PIPING & INSTRUMENT DIAGRAM FOR DIESEL SYSTEM

COMPUTER CODE	4985-PB-2217-0
SHEET SIZE	A3
SCALE	NTS
REPLACES DWG. NO.	

NOMINAL PIPE SIZE		½ "	¾"	1"	1 ½ "	2"	3"	4"	6"	8"	10"	12"	14"	16"	18'	20"	24"	26"	28"	30"
NOMINAL WALL THICKNESS	Threaded	SCH.80S				SCH-80S													0.938"	
	Socket welded	SCH.80S																		
PIPE		ASTM A-312 TP 304L (SMLS)P.E.AS PER ASME B36.19M.				ASTM A-312 TP 304L (SMLS) B.E.AS PER ASME B36.19M.							ASTM A-312 TP 304L (SMLS) B.E. or ASTM A-358 TP 304L (EFW) Class 1 B.E							
FLANGES		SW 600 LB. RF ASTM A-182 F304L TO ASME B16.5				WN 600 LB. RF ASTM A-182 F304L TO ASME B16.5 BORE TO MATCH PIPE														
FITTINGS		SW 3000 LB ASTM A-182 F304L TO ASME B16.11				BW TO MATCH PIPE ASTM A-403 WP 304LTO ASME B16.9														
OLETS		SW 3000 LB ASTM A-182 F304L TO MSS SP-97				BW, BORE TO MATCH PIPE ASTM A-182 F304L TO ASME B16.9														
GASKETS		600 LB SPIRAL WOUND TO ASME B16.20 CONSISTING OF 4.5mm THK. TYPE 316 ST. STEEL STRIP WITH NON-ASBESTOS FILLER & 3.2mm THK. CARBON STEEL OUTER AND INNER RINGS.																		
PIPE NIPPLES		Material as pipe 100mm long																		
SWAGE NIPPLES		Material as pipe to BS 3799																		
BOLTING		TO ASTM A-320GR. B8 C/W 2 HEX NUTS TO ASTM A-194 GR. 8.																		
SPEC. BLIND/ SPADE & SPACER						SPEC. BLIND ASTM A-240 GR. 304L							SPADE & SPACER ASTM A-240 GR. 304L						
VALVES	GATE	VG-105 (SW x THD)				VG-109														
		VG-106 (SW)																		
	GLOBE	VGL-104 (SW)				VGL-106							USE GATE VALVE							
	CHECK	VC-104 (SW)				VC-105														
	BALL (REDUCED BORE)	VB-106 (SW)				VB-108														
	BALL (FULL BORE)					VB-109														

SERVICE: H.P. Plant Gas/liquid Piping, Chemical Inhibition.

90º BRANCH CONNECTIONS

NOMINAL BRANCH PIPE SIZE (INS)

NOMINAL RUN PIPE SIZE (INS)	½	¾	1	1½	2	3	4	6	8	10	12	14	16	18	20	24
24	S	S	S	S	W	W	W	W	W	R	W	W	R	R	E	
20	S	S	S	S	W	W	W	W	W	R	W	R	R	E		
18	S	S	S	S	W	W	W	W	R	R	R	R	E			
16	S	S	S	S	W	W	W	R	R	R	R	E				
14	S	S	S	S	W	W	W	W	R	R	R	E				
12	S	S	S	S	W	W	W	R	R	R	E					
10	S	S	S	S	W	W	W	R	R	E						
8	S	S	S	S	W	W	R	R	E							
6	S	S	S	S	W	R	R	E								
4	S	S	S	S	R	R	E									
3	S	S	S	S	R	E										
2	S	S	S	S	E											
1½	R	R	R	E												
1	R	R	E													
¾	R	E														
½	E															

LEGEND

E = EQUAL TEE
S = SOCKOLET
R = REDUCING TEE
W = WELDOLET

DESIGN CONDITIONS		STUD BOLTS		
TEMP.	PRESS.	NOMINAL PIPE SIZE	DIAMETER (Ins) & LENGTH (mm)	NO. OF BOLTS
ºF	**PSIG**	½ "	1/2 x 80	4
15 to 100	1480	¾"	5/8 x 90	4
200	1350	1"	5/8 x 90	4
300	1315	1 ½ "	3/4 x 110	4
400	1270	2"	5/8 x 110	8
500	1200	3"	3/4 x 130	8
600	1095	4"	7/8 x 150	8
650	1075	6"	1 x 170	12
		8"	1-1/8 x 200	12
		10"	1-1/4 x 255	16
ºC	**BARG**	12"	1-1/4 x 255	20
-9 to 38	102.1	14"	1-3/8 x 270	20
50	100.2	16"	1-1/2 x 295	20
100	92.8	18"	1-5/8 x 315	20
150	90.5	20"	1-5/8 x 335	24
200	87.6	24"	1-7/8 x 390	24
250	83.4			
300	77.5			
350	73.9			

PIPING MATERIAL SPECIFICATION					
	PROJECT Gas Plant Facility Project				
ENAR	**SPEC.** DC	**CORROSION ALLOWANCE** 0.0 mm	**DESIGN CODE** ASME B31.3		
	RATING ASME 600 LB RF	**MAIN MATERIAL** STAINLESS STEEL	**JOB NO.** 14 - 4985		

Rev.	Date:	Description	Prep. by:	Chk. by:	Appr. by:
A	10/1/2011	FIRST ISSUE	WRK	MK	FS

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NOTES

A. PRESSURE / TEMPERATURE LIMITS ARE BASED ON FLANGE RATINGS IN ACCORDANCE WITH ANSI / ASME B 16.5 LATEST EDITION.

B. PRESSURE / TEMPERATURE RATING NOT APPLICABLE TO SOFT SEATED VALVES. E,G. BALL VALVES .

C. TEST PRESSURE: 2100PSIG, REFER TO LINE LIST FOR HYDROSTATIC TEST PRESSURE.

D. STAINLESS STEEL MATERIAL SHALL BE SOLUTION ANNEALED.

E. STUDBOLT LENGTHS SHOWN ARE BASED ON ANSI/ASME B 16.5 LATEST EDITION AND ARE FOR STANDARD FLANGE BOLTING, SPECIAL BOLT LENGHTS E.G. FOR SPECTACLE BLIND, TO BE CALCULATED TO SUIT.

F. COLD WORKING IS NOT PERMITTED.

G. ALL COMPONENTS TO BE WELDED SHALL MEET THE FOLLOWING REQUIREMENTS.

(a) CARBON CONTENT = 0.030 % MAX

H. IF IMPACT TESTING IS REQUIRED REFER TO PROJECT SPECIFICATION FOR PIPING DESIGN AND MATERIAL AND

I. ALL PIPING MATERIAL SHALL BE COMPLIANCE WITH NACE MR-01-75/ ISO15156 (LATEST EDITION)

J. FOR DETAIL REQUIREMENT OF VALVES REFER DOC#4985-PA-2003.

ADDITIONAL NOTES

PIPING MATERIAL SPECIFICATION	**PROJECT** Gas Plant Facility Project							
ENAR	**SPEC.** DC	**CORROSION ALLOWANCE** 0.0 mm	**DESIGN CODE** ASME B31.3	A	10/1/2011	FIRST ISSUE	WRK	MK	FS
				Rev.	Date:	Description	Prep. by:	Chk. by:	Appr. by:
	RATING ASME 600 LB RF	**MAIN MATERIAL** DUPLEX STEEL	**JOB NO.** 14 - 4985	Doc. No. 4985-PA-2002-09(Sheet 2 of 2)					