



NASHPA COMPRESSION FACILITY PROJECT


Tender Enquiry No.: PROC/FC/CB/PROJ/NASHPA-3268/2018 PRE-BID CLARIFICATION # 12



One of the bidder has asked following queries, OGDCL/ENAR responses are as follows:

S.No.	Clarification By Bidder	OGDCL / ENAR Response
Process Queries		
1	Refer Section 2.0 SOW, please share raw gas (along with hydrocarbon and free water) composition at compression facility inlet. Client is requested to also specify that composition to be considered as Dry or wet basis. Client is also requested to share hydrocarbon liquid and water composition and flowrate so that hydraulic and sizing calculation can be performed.	Reply of this query shall be provided soon.
2	Refer Slug Catcher P&ID (Dwg No. NGP-001-PCS-15.09-0002-01 SH 2 OF 3), NOTE-09 stated that utilization of PCV-2002B shall be checked for future case by EPC Contractor during detailed engineering. Client is requested to elaborate the statement which case is referred and if PCV-2002B fails on respective case in detailed engineering, would it be supplied with cost adder ?	Please be noted that the purpose of referred note is to make EPCC understand that the said PCV i.e. PCV-2002B shall not be used in future and shall be dismantled from its current location, therefore, if any requirement of PCV is arisen during detailed engineering any where in the compression project, EPCC will have to consider the same dismantled PCV-2002B for the requirement prior to considering new PCV. No price adder shall be entertained after award of contract.
3	Refer FEC Slug Catcher P&ID (Dwg No. 0193-PB-2101), Only Instrument air supply is part of scope whereas any plant air or utility water supply from existing header up to compression facility is not part of scope.	The requirement of offsites and utilities is mentioned in Sec-III (Scope of Work)-clause 2.3, furthermore, Plant air and utility water connections to compression facility shall also be required.
4	Refer FEC Slug Catcher P&ID (Dwg No. 0193-PB-2101), in order to calculate preliminary overall compression facility flare header size, please share max allowable back pressure on flare tie-in location.	Refer Sec-III (Scope of Work)-sub-clause 2.3.4
5	Bidder understand that all process engineering calculations/studies shall be limited from the tie-in battery limits till compressor packages and vice versa for all process and utilities connections related to Compression facility SoW. The adequacy check and further remedial action related to existing equipment i.e. Slug Catcher, HP/MP/LP Separators, Condensate Flash Separator, Produced Water Degasser based on revised operating conditions are not part of bidder scope. Please confirm bidder understanding.	Bidder to note that adequacy check of all related equipments (i.e. Slug Catcher, HP/MP/LP Separators, Condensate Flash Separator, Produced Water Degasser) has already been done in Basic Engineering Phase on given operating conditions in tender document. Bidder to refer Sec-III (Scope of Work) clause 2.0 for Processing Engineering Scope of work.
6	Bidder understand that existing fire water tanks, pumps and associated piping headers are adequate for the compression facility fire fighting however bidder to take respective tie-ins from existing fire water header and further to design, construct and installed proper fire fighting system for compression facility based on international codes and standards as specified in project ITB. Please confirm bidder understanding.	Refer Sec-III (Scope of Work)-sub-clause 2.3.3
7	Refer to proposed PFD of project highlighted total compressor facility manual by-pass arrangement however any such arrangement not found in ITB P&IDs. Please clarify whether overall compression facility manual by-pass (from slug catcher to Evaporative cooler EA-2101) shall be required or not ?	Overall compression facility manual by-pass (from slug catcher to Evaporative cooler EA-2101) is required and is already shown in P&ID# NGP-001-PCS-15.09-0003-02-0 Sheet 1 of 4 (P&ID For Nashpa H.P Production Separator).
8	Refer Section 2.0 SOW, Section 2.1, it is stated that PCV shall be installed for early high suction pressure scenario to laid down suction pressure from 1050 psig to 600 psig at compressor inlet. Client further clarified in earlier PBC response that this PCV shall further be by-passed once such high suction pressure scenario is over. Please note that for recip compressor, it is usual practice to install suction PCV in order to automatic suction control of compressor for any process mal-functioning scenario to avoid compressor trips and such suction PCV are usually sized for 10-15 psi dP for max flow condition. If above stated PCV will be by-passed then which PCV to be used during normal operating scenario. Should two parallel PCVs (one for 1050 to 600 psig dP condition and one for 15 psi dP normal operating condition) shall be provided (with bypass arrangement). Please clarify.	Minimum requirement are mentioned in the Tender Documents. For the safe, continuous and trouble free operation of the compressors, if bidder understands that this requirement is necessary as per the relevant codes & standard then consider this requirement.
9	Bidder understand that if suction PCV (for 1050 to 600 psig pressure laid down case) is installed at compressor inlet then higher pressure scenario could occur during PCV stuck open/failure case and accordingly over-pressure protections (for 100% PCV open flowrate basis on max inlet pressure i.e. 1050 psig) shall be required before each compressor suction scrubber which is currently missing in ITB P&IDs. Client is requested to clarify if this should include at this stage in bidding else can be taken in cost adder during detailed engineering.	Bidder to note that over pressure protection at inlet of scrubber is already mention in ITB P&ID. Please refer P&ID # 0193-PB-2102-0 SHEET 1 OF 2 (Typical P&ID For Front End Compressors). No price adder shall be entertained after award of contract.
10	Bidder understand that all utilities sources (i.e. Fire Water, Fuel Gas, inert gas) are already enough capable to supply required utilities for compression facility. The adequacy check and their mitigation are not part of this project. Bidder to take tie-ins from existing respective utilities headers and further to design up to compression facility as per international standards and design practices. Please confirm bidder understanding.	Refer Sec-III (Scope of Work)-clause 2.3

11	Bidder understand that any existing flare system modification due to compression facility is not part of project. Bidder understand that scope is only related to design proper relief system w.r.t. compression facility and then tie-in into existing flare header. Please confirm bidder understanding.	Refer Sec-III (Scope of Work)-sub-clause 2.3.4																												
12	Client is requested to share SIL level for the instrumentations of Compressor Skid as well as for Balance of Plant under project scope.	All skid instrumentation shall be provided as per requirement mentioned in ITB document No. 0193-IMA-6000-0 (Specification for General & Packaged Instrumentation).																												
13	<table border="1" data-bbox="365 432 1370 644"> <tr> <td>Droplet Removal Size (Light Phase in Vapor)</td> <td>$D_{p, LLP \text{ in Vapor}}$</td> <td>700</td> <td>$\mu\text{m}$</td> </tr> <tr> <td></td> <td></td> <td>0.0007</td> <td>m</td> </tr> <tr> <td>Droplet Removal Size (Heavy Phase in Light Phase)</td> <td>$D_{p, HLP \text{ in LLP}}$</td> <td>1200</td> <td>$\mu\text{m}$</td> </tr> <tr> <td></td> <td></td> <td>0.0012</td> <td>m</td> </tr> <tr> <td>Droplet Removal Size (Light Phase in Heavy Phase)</td> <td>$D_{p, LLP \text{ in HLP}}$</td> <td>200</td> <td>$\mu\text{m}$</td> </tr> <tr> <td></td> <td></td> <td>0.0002</td> <td>m</td> </tr> <tr> <td>Slug Volume</td> <td>V_{slug}</td> <td>51.000</td> <td>m^3</td> </tr> </table> <p>As per the sizing/rating of existing slug catcher shared in ITB, the liquid in gas outlet shall be of 700 micron which will be directly routing to Compressor Inlet. Bidder understand that this will arise the requirement of Inlet Separator due to the fact that during low pressure, water production increases which will further make problem for compression operation. In addition, Compressor Scrubber are only worked for scrubbing the liquid usually from 150 microns (not 700 microns). Furthermore, in high pressure gas scenario where pressure will be laid down from 1050 psig to 600 psig, then flashed liquid will also need to be separated. All such considerations further arise the requirement of inlet separator before the compressor skid because such a high liquid droplet micron size is not recommended for any compressor skid. Since the inlet separator are not part of scope, please clarify that if such requirement arises during detailed engineering then shall be considered as cost adder.</p>	Droplet Removal Size (Light Phase in Vapor)	$D_{p, LLP \text{ in Vapor}}$	700	μm			0.0007	m	Droplet Removal Size (Heavy Phase in Light Phase)	$D_{p, HLP \text{ in LLP}}$	1200	μm			0.0012	m	Droplet Removal Size (Light Phase in Heavy Phase)	$D_{p, LLP \text{ in HLP}}$	200	μm			0.0002	m	Slug Volume	V_{slug}	51.000	m^3	Minimum requirement are mentioned in the Tender Documents. Bidder to design the compression facilities in such a way that the safe, continuous and trouble free operation shall be carried out for all the pressure cases as mentioned in the tender documents. No price adder shall be entertained after award of contract.
Droplet Removal Size (Light Phase in Vapor)	$D_{p, LLP \text{ in Vapor}}$	700	μm																											
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14	Please provide Missing P&IDs: PCS-15.09-0025-16(CLOSE DRAIN) PCS-15.09-0003-02 P&ID for LP, MP and HP separators for review the scope related to modification required.	Mentioned P&IDs are already provided in Volume-II of tender document. However, the required P&IDs are being provided again.																												
15	It is recommended that Compressor scrubbers Process drain and manual drain shall be routed through separate header which further routed to existing Flash Separator/Close Drain Vessel (Process Drain) and Manual Drains toward existing oily water system. Please confirm bidder understanding so that piping and respective tie-ins can be evaluated by bidder.	Bidder's understanding is correct, however, same philosophy is already mentioned in tender P&IDs. Furthermore, in this regard, also refer clarification # 2, point-8.																												
16	As per Note-F P&ID # NGP-001-PCS-15.09-0026-17 Please provide the capacity of current IA single compressor with make and model details of existing insrtument air compressor.	Refer document # 0193-DS-1702-0 (DATA SHEET AIR COMPRESSOR K-3401C).																												
17	Refer Slug Catcher P&ID (Dwg No. NGP-001-PCS-15.09-0002-01 SH 2 OF 3), NOTE-10 stated that FIT-2001, PT-2004 and TT-2001 along shall be relocated at downstream of compressor discharge header. Client is requested to confirm whether such instrument can work with 2-phase flow since gas after compressor shall directly be routed to existing HP Separator via Evaporative cooler (EA-2101), Since there is no scrubber at downstream of after cooler as per ITB Compressor P&IDs then there is tendency of 2-phase at compressor common discharge header. Since ITB SoW stated that FIT shall be relocated at compressor discharge header, then it should cater 2-phase. Please clarify.	The process conditions for FIT-2001, PT-2004 and TT-2001 at proposed location is about same as installed in the existing locations. However, for FE-2001, Bidder shall further confirm the suitability of FE-2001 prior to bid submission.																												
18	Bidder understand that all As-Built existing drawings in Native format shall be shared to successful contractor from client before commencement of work.	Bidder understanding is correct.																												
Mechanical / Piping Queries																														
1	With reference to reciprocating compressors specifications, The minimum design life shall be 20 years for package, However as per SEC-III(SOW), Refer Para 1.1.2, The EPCC Contractor shall consider 25 years design life of the project and equipment. Please confirm.	The bidder understanding is correct. Bidder shall consider 25 years design life of the equipment.																												
2	Please confirm that new instrument air compressor space is available on existing compressor skid.	Bidder shall install new Air Compressor on new civil foundation.																												
3	Bidder considered that the new piping which will be routed on existing pipe racks for Tie-in with existing system as per Piping Layouts provided in ITB, It is considered that enough space is available in pipe racks for these lines, Please confirm.	Confirmed. Further proposed pipe routing on pipe rack has also been done on the piping layouts for bidder understanding.																												
4	Existing pipe racks adequacy check is not in Bidder SOW and it is considered that these racks have been designed with future provision.	Bidder understanding is correct.																												
5	With reference to SEC-III(SOW), PARA 3.6, point#6, Please note that the Specifications provided for piping have been considered. Please confirm.	Please note that all the specifications mentioned in the referred para have to be prepared by EPC Contractor during detail engineering phase and shall submit to OGDCL/Engineering Consultant for our review and approval.																												
6	Static stress Analysis will be performed for new lines only in line with ITB requirements during detailed engineering upto 6 supports of existing line after tie-in.	Bidder to consider virtual anchoring for existing lines inclusion for Tie-ins to perform stress analysis.																												

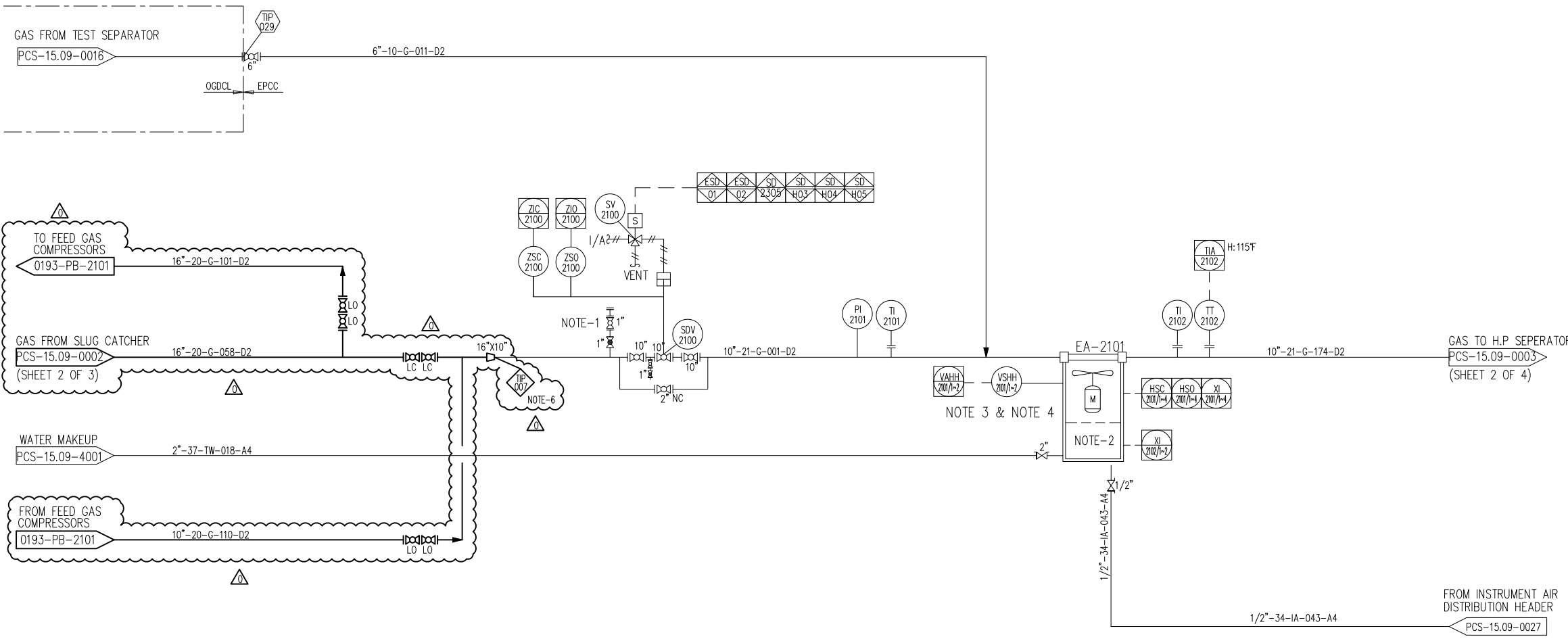
7	All connections on skid edge will be considered as rigid and anchor for new piping system, Compressor packager will make sure that the actual piping loads on skid edge are able to cater piping loads as per stress analysis.	Bidder shall consider the displacements and allowable stress values (provided by Packager) on the nozzle of the Compressor Package and stress analysis shall be performed accordingly.
8	All new piping for this bid is with in scope of B31.3.	Noted. Further, all new piping shall be in accordance with the piping specification attached with the Tender document.
9	Plot plan and equipment location will be reviewed and updated during detailed engineering as per finalized compressor package details and spacing criteria of OGRA.	Bidder understanding is correct.
10	All packing vents will be routed above shed of compressor.	Bidder understanding is correct.
11	Please provide HP, MP & LP separataor piping layouts for piping routing as per P&ID`s.	The modification in piping for HP, MP & LP Separator area has already been made in the isometric which is attached in Volume-IIB (Mechanical).
12	Please note that all Class 600 Piping shall have RF Flanges instead of RTJ. Kindly confirm.	Confirmed.
13	As per Compressor Package Datasheet (0193-DS-1701-0), kindly specify whether package dimensions i.e. 12m x 4m x 4m (L x W x H) are fixed or can be changed during Detail Engineering.	We have proposed the approximate dimension of the Compressor Packager but these dimension will be finalized by EPC Contractor after getting drawings from their Packager.
14	Bidder understand that all As-Built existing drawings in Native format shall be shared to successful contractor from client before commencement of work.	Bidder understanding is correct.
Instrument & Control Queries		
1	Refer to document Architecture diagram Note 3 we understand that the signals referred in these notes are individual hardwired shut down signals for each compressor from Critical control panel to ESD System , Please confirm.	<p>The signals refered in notes are individual shut down signals for each compressor from ESD/MOS OPERATOR CONSOLE placed in CCR. Picture of existing ESD/MOS Panel is attached for overview.</p> 
2	Refer to document Architecture diagram Note 3 Please clarify if the cables between MOS/ESD panel and ESD Martialling cabinet have any spares to accommodate new compressor shutdown signals , in case of no spares kindly provide the distance between them.	Contractor shall supply separate MOS Panel to be placed in existing Control Room. MOS panel shall be similar to existing MOS panel installed in CCR. This shall include supply of cables between MOS panel to ESD system, ESD Push Buttons, indication of F&G Alarm, indication for Gas compressor trip and shutdown MOS and Reset Switch and any other accessories required. List of Indications, alarm and signals to be connected with MOS panel shall be finalized during detailed engineering stage.
3	Refer to document Architecture diagram Note 4 Please clarify if these two signals are indicative signals, one of them indicating Fire and gas detection on compressor and other one indicating compressor trip due to any internal cause.	The signals refered in Note-4 of Architecture Diagram, are hardwired Shutdown signals between Compressor PLC and Plant existing Safety System. All logic modification in Plant existing System including initiation of different level Trips on effect of Compressor Hardwired signals shall be done by the EPCC in accordance with the plant Cause & Effect diagram. Furthermore EPCC shall update & develop Cause & effect diagram during detail engineering stage with consultation with Client/Engineering consultant.
4	Refer to document Architecture diagram Ethernet cable for compressors at CCR end seem to be routed directly to EWS and OWS from F/O to Ether convertor switch, is there any existing network in between? If yes please share existing Architecture.	Contractor shall be responsible for supply and installation of required FO/Ethernet conversion switches at both end for protocol conversion.
5	Please share existing control systems details such as make , model etc.	<p>Details of Existing Control Systems are as follow:</p> <p>DCS: Honeywell Experion PKS C300</p> <p>ESD: Honeywell Safety Manager</p>

6	Is there any other communication protocol option available in Plant network architecture other than Modbus TCP , for e.g. Modbus RTU?	Soft communication between Compressor and existing plant control system network is not required. Only Hardwired Interfaces are required between Compressor Panel and Existing Plant Control & ESD system.
7	How many existing engineering and operators work stations are currently there in control room for rest of the facility?	Details regarding existing equipments placed in Control room will be provided to successful bidder (if required) after award of contract.
8	Refer to document Fire & Gas detectors Layout We consider that the provided quantity , positions and types of detectors are tentative only and shall be finalized as per F&G mapping study. Please confirm.	Bidder understanding is correct. The F&G detectors quantities shown in F&G Layout are least quantity which may increase after Mapping study during detail engineering stage. Furthermore F&G detectors inside the Compressor Skid are not shown due to insufficient information at FEED stage. Bidder shall develop the detail F&G layout during detail engineering stage showing F&G Detectors within and outside compressor package.
9	Refer to document Scope of work Instrumentation and control Engineering Bullet 5.13 Please elaborate what control signals needs to be considered from operator/Engineering work station in case selector switch sets on remote operation.	The following needs to be considered for individual Compressor with remote operation from Workstations; -Compressor Start/Stop -Compressor Shutdown -Provision to enter Inlet PCVs Setpoints This shall further be discussed and finalized during detail Engineering Stage with the Consultation with Client/Engineering Consultant.
10	Bidder understand that proper 2D F&G mapping study shall be carried out to finalize F&G detectors in Compression facility. Please confirm bidder understanding.	Contractor shall carry out Mapping Study based on 3D layouts. Location of F&G detectors shall be shown on same.
11	Bidder understand that all As-Built existing drawings in Native format shall be shared to successful contractor from client before commencement of work.	Native file of available drawing related to this project shall be shared with successful bidder. In case on non-availability of Native file contractor may have to develop the same for updation/modification as required.
Civil & Structural Queries		
1	In Volume I Section-III (Scope of Work) Point number 12.3.12, it is mentioned that FGL of NCF shall be compatible to FGL of existing plant. Also, In volume IIE (Civil) drawing no. NGP-000-GEN-15.01-0001-00-02-General Plot Plan, FGL of proposed location of FEC compressors is mentioned as +567.30 along with FGL of adjacent existing features (LPG Bullets(+562.7) Electrical & Power Generator Building (+571.60), CCR (+570.0) etc.). Therefore it is required from Client to confirm the Existing Ground Level of Proposed FEC compressor area (STEP-2), along with topography of area and required Final Ground Level in order to finalize the requirement of cut and fill.	Ground elevations are already provided. Refer "Site Grading and Leveling Plan". Bidder is required to ensure that the FGL's of NCF shall not contradict with the overall profile / Scheme of the Plant. For same reason, the compatibility requirement was mentioned.
2	As mentioned in Volume I Section-III (Scope of Work) Point number 12.3.12.5, Fireproofing specification shall be provided by client for steel structure.	As per referred clause "The fire proofing shall be carried out in strict accordance with OGDCL's approved Specification for Fire Proofing".
3	In Volume IIE (Civil) drawing # NGP-000-GEN-15.01-0002-00 shows existing RAW water pond in proposed location of FEC compressors, Bidder understands demolition/relocation & backfilling along with any other related piping (above & underground) is NOT in project scope.	The project area would be cleared by OGDCL for any other installation.
4	In Volume IIE (Civil) Soil Investigation Report Appendix-A, there is NO borehole located in proposed FEC compressor area. It is essential to know geotechnical parameters along with bearing capacity & dynamic parameters beneath compressors. Client to confirm requirement of New Geotechnical Investigation.	Please refer to clause 6.4 wherein it is mentioned that "The EPCC Contractor shall also undertake any additional survey work he considers necessary to verify the Soil, Survey and other data provided by OGDCL.
5	Volume IIE (Civil) drawing # NGP-000-SCW-15.01-0001-00-00-General Notes for Reinforced Concrete Works indicates a table showing Min. Cylinder Crushing Strength at 28 days as 32 Mpa with type of structure missing. Bidder understands there is NO need for 32 MPa concrete.	It is EPCC Contractor's responsibility to perform detailed calculations and accordingly prepare detailed drawings. Therefore correct selection of concrete strength is EPCC Contractor's responsibility.
6	Volume IIE (Civil) Specification # NGP-000-SCW-15.03-0003-00-00-Specification for Brick Works provided by Client, Bidder understand there is NO scope of brick works in project scope.	The existing specifications, being followed for the civil construction works of plant have been provided, It is EPCC Contractor's responsibility to prepare and submit basic and detailed calculations and specifications etc.
7	Volume IIE (Civil) Specification # NGP-000-SCW-15.03-0005-00-00-Specification for Block Masonry provided by Client, Bidder understand there is NO scope of block works in project scope.	Please refer response against 6 above.

8	Point no. 6.1.1 (Concrete grade) Volume IIE (Civil) Specification # NGP-000-SCW-15.05-0001-00-00-Design Basis for Civil and Steel Structures Works provided by Client, shows concrete grade of 28 Mpa for superstructure and 21 Mpa substructure. Please note that All Civil work except compressor foundation shall be 21 MPa concrete.	Please refer response against 5 above.
9	In Volume I Section-III (Scope of Work) Point number 6.1, it is mentioned regarding architectural & external works. However, Bidder understands there is NO architectural and external works in project scope.	Requirement, have been mentioned to indicate overall responsibility for EPCC Contractor w.r.t NCF design & Construction.
10	In Volume I Section-III (Scope of Work) Point number 6.1, it is mentioned regarding design and construction of roads, however Bidder understands existing roads are present in facility and there NO new or addition of road works (concrete or/and asphalt).	Please refer 12.3.12.7 for better understanding.
11	In Volume I Section-III (Scope of Work) Point number 6.6, it is mentioned regarding sunshade, however bidder understands there is NO sunshade in project scope.	Such requirement would be reviewed upon submission of detail design by EPCC Contractor.
12	In Volume I Section-III (Scope of Work) Point number 12.9, it is mentioned regarding design and construction of Culverts. However, Bidder understands there is NO need of culverts in project scope.	Please refer response against 11 above.
13	In Volume I Section-III (Scope of Work) Point number 12.3.12.8, it is mentioned regarding Oily water drainage and tie-in with existing networks. Client to provide existing network drawing and specification for Oily Water system. Bidder understands adequacy check of existing system is NOT in project scope.	Bidder understanding is correct.
14	In Volume I Section-III (Scope of Work) Point number 12.3.12.8, it is mentioned regarding Storm water drainage and tie-in with existing networks. Bidder understands adequacy check of existing system is NOT in project scope.	The EPCC Contractor would be required to study the existing network philosophy and ensure proper drainage.
15	In Volume I Section-IIC (Electrical) point number 1.7-1, it is mentioned regarding paved area type of cable trench. Client to confirm should it be brick wall or concrete wall trench?	General requirement of cable installation in paved area is mentioned in referred document. Brick wall trench with cover shall be considered in paved area.
16	In Volume I Section-IIC (Electrical) drawing # NGP-000-ELE-15.01-0002-24 Cable Routing Layout for General Area, Bidder understands Sleeve no 3 and 12 are already installed on site and same shall be utilized for cable laying. If not, bidder to cross existing roads using cable tray supported on existing pipe rack instead of road crossing sleeves.	New power cables shall run in existing concrete trench and on cable tray as marked in referred layout, existing sleeves 3 & 12 will not be used for road crossing. Further, cable route layout will be finalized and updated by EPC Contractor during the detail engineering as per site actual site conditions.
17	Bidder understand that all As-Built existing drawings in Native format shall be shared to successful contractor from client before commencement of work.	Bidder understanding is correct.
Electrical Queries		
1	Lightning Protection System will only be depended on Lightning Risk Assessment Study. Kindly confirm.	YES. The compiled study report based on IEC 62305-2 & Pakistan Metrology's information shall be submitted to OGDCL / Consultant for review and approval by EPC Contractor as per ITB SOW.
2	If Lightning Protection System will be required then it will connected with New Earthing system of new Compressor Facility.	YES. Separate earthing pits/electrodes will be considered for subject lightning protection. Consequently, the new earthing system shall be interconnected with the existing earthing network to achieve the equivalent network earth resistance.
3	Lighting System will be provided as per Lighting Level Calculation (LUX Study Report). Kindly confirm	YES. Subject calculation report shall be submitted to OGDCL / Consultant for review & approval.
4	All Emergency lights shall not be Essential Luminares. Essential Luminares will only be provided at escape routes and emergency exits which shall have 1 hour battery backup. Kindly confirm.	YES.
5	New Lighting Distribution Board will be connected with Main Distribution Board. Kindly confirm	YES.
6	New Lighting Distribution Board will be placed in safe area.	Location of LDB placement shall be finalized during the detail engineering by EPC Contractor.
7	Kindly confirm there is sufficient feeders available in Existing Main Distribution Board, Emergency Distribution Board and UPS Distribution Board to cater all New Load related to New Compressor Facility.	YES. Further, EPC Contractor to check and verify all the selected feeder/ sub-feeder breaker selection as per load requirement during the detail engineering as per ITB SOW.
8	All New Load related to New Compressor Facility will be connected to Existing Distribution System. Hence, no new MCC Panel has been considered.	YES. Only instrument air compressor package MCC shall be provided by EPC Contractor.

9	Cathodic Protection will only be provided for oily water sewerage & Fire water network underground pipeline only in New Compressor Area. Kindly confirm.	YES.
10	Electrical Heat Tracing will only be provided only on Compressor Skid only for Level Instruments & Bridles. Kindly confirm.	YES.
11	Only one Industrial Welding Socket Outlet (32A, 5pin, 3phase+N+E) has been considered and also only one General Purpose Convenience Outlet (16A, 3pin, 1phase+N+E) has been considered for new Compressor facility. Kindly confirm.	YES.
12	Referring Doc # NGP-000-ELE-15.01-0002-24 Cable Routing Layout for General Area. Client to confirm Sleeve # 3 & 12 are already present or not. If not then cable trays will be used for road crossing using existing pipe rack. Duct bank will only be used if present.	New power cables shall run in existing concrete trench and on cable tray as marked in referred layout, existing sleeves 3 & 12 will not be used for road crossing. Further, cable route layout will be finalized and updated by EPC Contractor during the detail engineering as per site actual site conditions.
13	As per Bidders understanding Referring Electrical PBC clause # 12, there is no requirement of Duct Bank as mentioned in Doc # 0193-ELA-6500 Electrical Design Basis, Clause # 1.7, Sub-clause # I. "Duct Bank System". Client to confirm.	General requirement of Duct Bank System is mentioned in referred document. EPC Contractor shall finalize the requirement of duct bank, if necessary during the detail engineering.
14	Referring Volume-II (Civil) Doc # 05-Hydrology Report. Average Value of Soil resistivity will be considered for Earthing Calculations. Client to confirm.	YES.
15	New Earthing system for New Compressor Facility will be connected with existing earthing system.	YES. This shall also include the earthing system of new air compressor & air dryer package.
16	Instrument Air Compressor will be earthed with existing earthing system present near Instrument Air Compressor. No new Pits have been considered for Instrument Air Compressor Area. Kindly confirm.	Earthing calculation report to be provided by EPC Contractor to OGDCL /Consultant for review and approval. However, minimum 01 no of earth pit to be considered for new instrument/air dryer package area.
17	Considering Compressor Facility, standard Stranded Cu/XLPE/PVC/SWA/PVC, 0.6kV/1kV power & control cables will be sufficient as this type of cables are self flame retardant. Bidder understands that specifically there is no such requirement of Fire retardant cables. Kindly confirm.	YES.
18	Kindly provide Doc # NGP-010-ELE-15 01-0002-13 "Single Line Diagram for Main Distribution Board"	Attached.
19	Kindly provide Doc # "Single Line Diagram for Emergency Distribution Board"	Main distribution board is comprised of normal bus-bar as well as the emergency bus-bar. Refer above attached SLD.
20	Kindly provide Existing Earthing Layout & Details.	Attached for reference only.
21	Kindly provide Load List of Existing System	Attached for reference only.
22	Bidder understand that all As-Built existing drawings in Native format shall be shared to successful contractor from client before commencement of work.	Native format with final revision will be shared.

EA-2101 INLET EVAPORATIVE AIR COOLER		
PRESSURE PSIG	DESIGN	1340
	OPERATING	1045
TEMPERATURE °F	DESIGN	200
	OPERATING (IN/OUT)	145/105
DESIGN DUTY, MMBTU/HR		5.57
MATERIAL(TUBE)		CS



NOTES

1. DE EMULSIFIER INJECTION CONNECTION SHALL BE PROVIDED.
2. FOR DETAILS, SEE VENDOR DRAWINGS.
3. THE NO. OF VIBRATION SWITCH DEPENDS ON THE NO. OF FANS.
4. THE NO. OF REMOTE RUN AND STOP SIGNALS DEPENDS ON THE NO. OF FANS.
5. THIS P&ID IS MODIFIED UNDER PROJECT# 14-0193.
6. TIE-IN POINTS SHALL BE CONFIRMED AND FINALIZED BY EPC CONTRACTOR IN DETAIL ENGINEERING PHASE.

REV.	DESCRIPTION	PRPD	CHKD	REVD	APPD	DATE
0	Issued For Tender	KI	JAY	MAS	MAS	09/03/2018
D	Issued For Approval	KI	JAY	MAS	AHB	05/01/2018
01	AS BUILT	Mei Chunlin	Qi Dezhen	Wang Dongjun	Wei Xiao	25/12/2017
00	Approved for Construction	Mei Chunlin	Qi Dezhen	Wang Dongjun	Wei Xiao	04/08/2016
C2	Issued for Approval	Mei Chunlin	Qi Dezhen	Wang Dongjun	Wei Xiao	24/05/2016
C1	Issued for Approval	Mei Chunlin	Qi Dezhen	Wang Dongjun	Wei Xiao	19/05/2016
C	Issued for Approval	Mei Chunlin	Qi Dezhen	Wang Dongjun	Wei Xiao	17/04/2016
B2	Issued for HAZOP	Mei Chunlin	Qi Dezhen	Wang Dongjun	Wei Xiao	07/03/2016
B	Issued for Review	Mei Chunlin	Qi Dezhen	Wang Dongjun	Wei Xiao	31/01/2016
A	Internal Discipline Check	Mei Chunlin	Qi Dezhen	Wang Dongjun	Wei Xiao	15/01/2016

CLIENT: **OIL & GAS DEVELOPMENT COMPANY LTD.**
 OGDCL HOUSE TOWER-B, FIRST FLOOR F806, BLUE AREA, JINNAH AVENUE ISLAMABAD PAKISTAN
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 TEL: (9221) 5062791 E-mail: info@enar.com.pk
 URL: www.enar.com.pk

CONSULTANT: **Zishan Engineers (Pvt.) Ltd.**
 An ISO 9001-2008 certified company
 47/F Block 6, PECHS, Karachi-Pakistan
 Tel: (92-91) 34393045-48, & 34310151-54, Fax: (92-91) 34533430 & 34510156
 E-Mail: contact@zishanengineers.com Website: www.zishanengineers.com

CONTRACTOR: **HONG KONG HUIHUA GLOBAL TECHNOLOGY LIMITED**

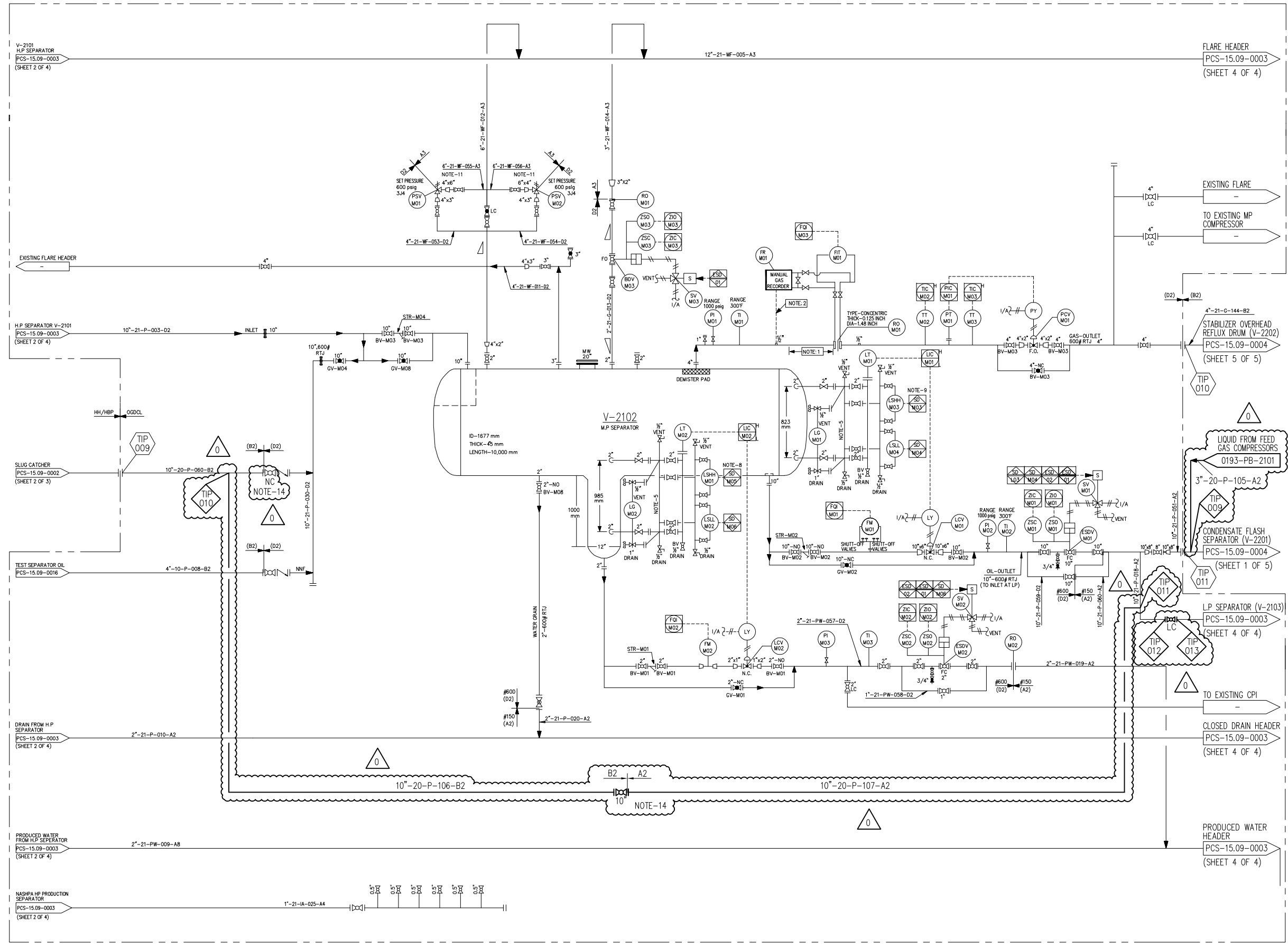
PROJECT TITLE: NASHPA GAS PROCESSING AND LPG RECOVERY PLANT PROC-FC-CB/NASHPA/PROJ-1247/2015

DRAWING TITLE: PIPING & INSTRUMENT DIAGRAM NASHPA H.P. PRODUCTION SEPARATOR (UNIT-21)

PROJECT NO. NASHPA 1247
 DRAWING NO. NPG-001-PCS-15.09-0003-02
 REV. SCALE SHEET
 0 ~ 1 OF 4

PARAMETERS		
	PRESSURE	TEMPERATURE
DESIGN	900 psig	204°F
OPERATING	300 psig	138.9°F

PROPERTIES			
FLUID	GAS	WATER	OIL
FLOW	5 MMSCFD	200 BPD (DES) 50 BPD (OPER)	20,000 BPD (DES) 18,000 BPD (OPER)
SP GRAVITY	0.65-0.75	1.01-1.03	37-40 @ 15.6°C -60 F API



- NOTES:**
- DISTANCE NOT LESS THAN 1400mm.
 - TEMPERATURE SENSING ELEMENT.
 - ALL CABLES SHALL BE TERMINATE AT JUNCTION BOX JB-01.
 - ALL FACILITIES WITHIN THE DOTTED LINE SHALL BE COMPLETED PROVIDED BY OGDCL. THE FINAL PID IS PROVIDED BY OGDCL SHOULD GUARANTEE THE ACCURACY AND PERFORMANCE OF M.P SEPARATOR SKID.
 - FOR OIL/WATER LEVEL MONITORING & CONTROL NEW SWITCH HAVE BEEN PROPOSED ON M.P SEPARATOR. TO ACCOMMODATE THE NEW ADDED SWITCHES WE NEED TO FABRICATE & INSTALL NEW BRIDLE ARRANGEMENT HAVING INSTRUMENT ACCOMODATION ON EACH BRIDLE.
 - BRIDLE ARRANGEMENT IS TO BE FABRICATED BY THE CONTRACTOR.
 - FOLLOWING INSTRUMENTS & CONTROLS VALVES ARE NEWLY PROPOSED IN THE RESULT OF HAZOP RECOMMENDATION AND DESIGN REVIEW OF M.P SEPARATION SYSTEM.
 - PSV-M01
 - BDV-M01
 - RO-M01
 - PT-M01
 - ESDV-M01, ESDV-M02
 - LSHH-M01, LSLM-M02, LSHH-M03, LSLM-M04
 - ON ACTIVATION OF LSHH-M01, ESDV-2201, ESDV-H02 & ESDV-1002 SHALL BE CLOSED.
 - ON ACTIVATION OF LSHH-M03, ESDV-2001, ESDV-H02 & ESDV-1002 SHALL BE CLOSED.
 - BDV & PSV AND IT'S LINE SIZES ARE ON HOLD.
 - PSV SIZE AND IT'S INLET/OUTLET REDUCER SIZES SHALL BE FURTHER CONFIRMED BY THE VENDOR. ANT SIZES SHALL BE UPDATED ONCE VENDOR INFORMATION SHALL BE RECEIVED.
 - THIS P&ID IS MODIFIED UNDER PROJECT# 14-0193.
 - TIE-IN POINTS SHALL BE CONFIRMED AND FINALIZED IN DETAIL ENGINEERING PHASE.
 - FOR 200 PSIG INLET RECEPTION PRESSURE CASE, OIL FROM THE SLUG CATCHER (SC-2001) SHALL BE ROUTED TO CONDENSATE FLASH SEPARATOR (V-2201)/LP SEPARATOR (V-2103).

REV.	DESCRIPTION	PRPD	CHKD	REVD	APPD	DATE
0	ISSUED FOR TENDER	KI	JAY	MAS	MAS	09/03/2018
D	ISSUED FOR APPROVAL	KI	JAY	MAS	AHB	05/01/2018
O2	AS BUILT	Mei Chunlin	Qi Dezheng	Wang Dongjun	Wei Xiaoo	25/12/2017
O1	APPROVED FOR DESIGN	Mei Chunlin	Qi Dezheng	Wang Dongjun	Wei Xiaoo	09/10/2016
O	ISSUED FOR DESIGN	UHS	AR	RA	MM	28/08/2016
C3	ISSUED FOR REVIEW	UHS	AR	RA	MM	24/08/2016
C2	ISSUED FOR REVIEW	UHS	AR	RA	MM	25/01/2016

CLIENT: OIL & GAS DEVELOPMENT COMPANY LTD.
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 URL: www.enar.com.pk

CONSULTANT: Zishan Engineers (Pvt.) Ltd.
 An ISO 9001:2008 certified company
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 E-Mail: contact@zishanengineers.com Website: www.zishanengineers.com

CONTRACTOR: HONG KONG HUIHUA GLOBAL TECHNOLOGY LIMITED
 PROJECT NO. NASHPA 1247

PROJECT TITLE: NASHPA GAS PROCESSING AND LPG RECOVERY PLANT PROC-FC-G3/NASHPA/PROJ-1247/ZB15
 DRAWING NO. NGP-001-PCS-15.09-0003-02

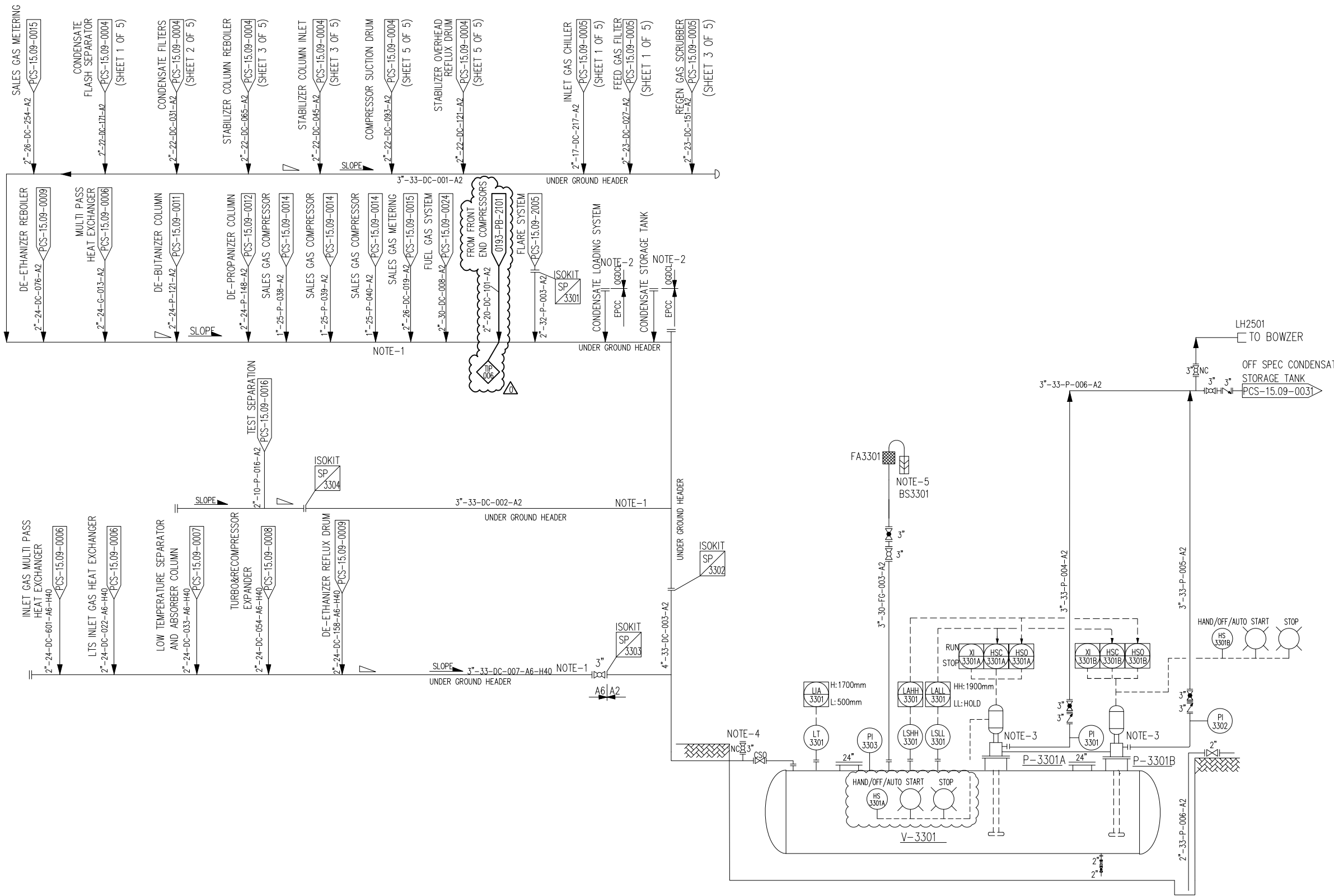
DRAWING TITLE: PIPING & INSTRUMENTATION DIAGRAM FOR NASHPA M.P. PRODUCTION SEPARATOR (UNIT-21)
 REV. SCALE SHEET 0 NTS 3 OF 4

V-3301 SLOP VESSEL		
DESIGN PRESSURE, PSIG	50	
OPERATING PRESSURE, PSIG	ATM	
DESIGN TEMPERATURE, °F	200	
OPERATING TEMPERATURE, °F	AMB	
INTERNAL DIAMETER, FT	7	
LENGTH(S/S), FT	33	
MATERIAL	A-516Gr.70	

P-3301A/B SLOP PUMPS	
FLOW, GPM	150
DIFFERENTIAL PRESSURE, PSI	40
MOTOR POWER, KW	11
MATERIAL (CASE)	CS

GENERAL NOTES

1. THE COLD DRAIN SHOULD BE ELECTRICALLY TRACED.
2. HBP/HH TO PROVIDE UTILITY CONNECTIONS CLOSE TO OPTIONAL BUILDINGS, EQUIPMENTS ETC FOR ALL DELETED ITEMS FROM SCOPE OF WORK. OGDCL/ZEL TO PROVIDE THE UTILITY CONSUMPTION DEMAND FOR CALCULATION OF LINE SIZE.
3. LR LOCAL-REMOTE SWITCH (BY ELECTRICAL).
4. THE PIPELINE JONITS ARE RESERVED FOR FUTURE.
5. ROUTE TO SAFE LOCATION.
6. DUTY/STANDBY SELECTION TO BE PROVIDED AS SOFT SWITCH ON DCS, SUCH THAT "DUTY" SELECTED PUMP IS AUTOMATIC STARTED ON LEVEL HIGH.
7. STANDBY PUMPS TO BE AUTOMATICALLY STARTED AFTER DELAY OF 30 SECONDS IN CASE OF FAILURE OF START OF "DUTY" PUMP.
8. THIS P&ID IS MODIFIED UNDER PROJECT# 14-0193.
9. TIE-IN POINTS SHALL BE CONFIRMED AND FINALIZED IN DETAIL ENGINEERING PHASE.



REV.	DESCRIPTION	PRPD	CHKD	REVD	APPD	DATE
0	Issued For Tender	KI	JAY	MAS	MAS	09/03/2018
01	As-built	Hao Yanjie	Qi Dezhen	Wang Dongjun	Wei Xiao	25/12/2017
00	Approved for Design	Hao Yanjie	Qi Dezhen	Wang Dongjun	Wei Xiao	04/08/2016
C2	Issued for Approval	Hao Yanjie	Qi Dezhen	Wang Dongjun	Wei Xiao	24/05/2016
C1	Issued for Approval	Hao Yanjie	Qi Dezhen	Wang Dongjun	Wei Xiao	19/05/2016
C	Issued for Approval	Hao Yanjie	Qi Dezhen	Wang Dongjun	Wei Xiao	17/04/2016
B2	Issued for HAZOP	Hao Yanjie	Qi Dezhen	Wang Dongjun	Wei Xiao	07/03/2016
B	Issued for Review	Hao Yanjie	Qi Dezhen	Wang Dongjun	Wei Xiao	01/02/2016
A	For Kick-off Meeting	Hao Yanjie	Qi Dezhen	Wang Dongjun	Wei Xiao	15/01/2016

CLIENT: **OIL&GAS DEVELOPMENT COMPANY LTD.**
 OGDCL HOUSE TOWER-B, FIRST FLOOR FIBRO, BLUE AREA, JINNAH AVENUE ISLAMABAD PAKISTAN
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CONTRACTOR: **HONG KONG HUIHUA GLOBAL TECHNOLOGY LIMITED**

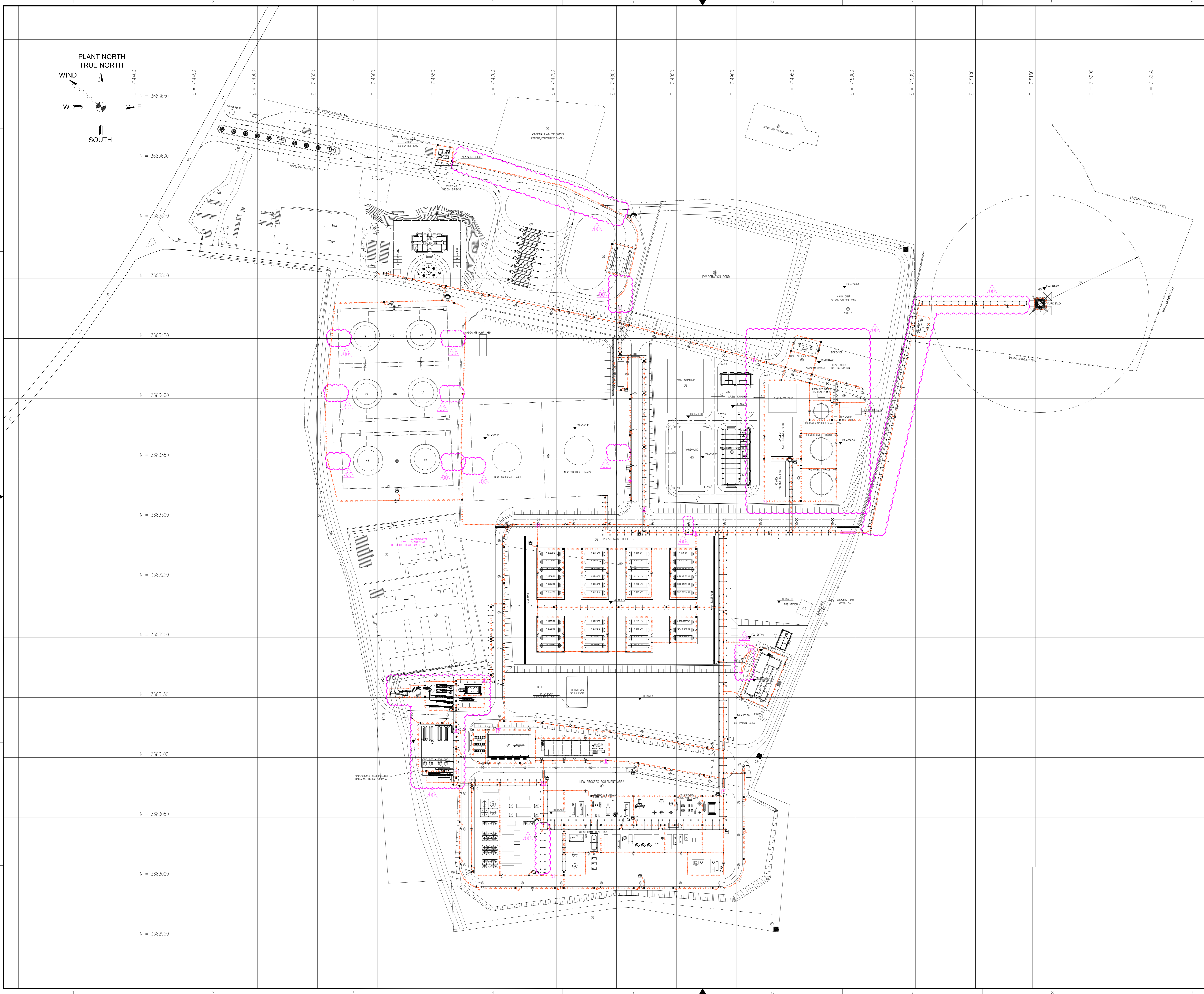
PROJECT NO. NASHPA 1247

PROJECT TITLE: **NASHPA GAS PROCESSING AND LPG RECOVERY PLANT PROC-FC-CB/NASHPA/PROJ-1247/2015**

DRAWING NO. NGP-001-PCS-15.09-0025-16

DRAWING TITLE: **PIPING&INSTRUMENT DIAGRAM CLOSED DRAIN SYSTEM (UNIT-33)**

REV. SCALE SHEET
 0 ~ 1 OF 1



GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, ALL COORDINATES AND ELEVATIONS ARE IN METERS, UNLESS OTHERWISE SPECIFIED.
2. THE DRAWING IS GENERAL PROTECTION LAYOUT, THE DETAILS CAN BE SEEN IN EACH UNIT.
3. THE EARTH BAR FOR PLANT AND EQUIPMENT WILL EARTHED TO THE MAIN GRID WHICH WILL BE INDICATED IN THE UNIT EARTHING LAYOUT.

LEGEND

- e2b- BARE STRANDED COPPER, 1x40mm²
- e4b- BARE STRANDED COPPER, 1x95mm²
- e8- GREEN/YELLOW STRANDED COPPER, PVC INSULATED, 1x70mm²
- e4b- BARE STRANDED COPPER, 1x95mm², RUN IN UNDERGROUND CONDUIT
- UNDERGROUND CAD WELD CONNECTION POINT
- ABOVEGROUND C-CLAMP CONNECTION POINT (WITH PVC TAPE)
- EARTHING ROD, COPPER CLAD STEEL, 16mm DIAMETER, 2.5m LENGTH
- INSTRUMENT EARTHING ROD, COPPER CLAD STEEL, 16mm DIAMETER, 2.5m LENGTH
- POWER SUBSTATION EARTHING ROD, COPPER CLAD STEEL, 32mm DIAMETER, 2.5m LENGTH
- EARTHING WELL
- EX-PROOF TELEPHONE
- EX-PROOF LOUDSPEAKER
- EX-PROOF INTERCOM AND PA CALL STATION
- EX-PROOF STROBE LIGHT
- LIGHTING POLE

REFERENCE POINT

BS-01	N (m)	E (m)	ELEVATION(m)	REFERENCE
SURVEY COORDINATE	3683280.201	714621.147	565.447	UTM WGS1984

REFERENCE DOCUMENTS

TITLE	DOC No.
ELECTRICAL DESIGN BASIS	NGP-000-ELE-15.05-0001-00
GENERAL PLOT PLAN	NGP-000-GEN-15.01-0001-00
ELECTRICAL TYPICAL INSTALLATION FOR EARTHING AND LIGHTNING PROTECTION	NGP-000-ELE-15.08-0002-00
LIGHTNING SYSTEM DESIGN & DETAILS	NGP-000-ELE-15.01-0003-00
CALCULATION FOR EARTHING SYSTEM	NGP-000-ELE-00.01-0005-00

EQUIPMENT AND BUILDING LIST

NO.	DESCRIPTION AND CAPACITY	UNIT	QTY	REMARK
1	PIG RECEIVER & GATHERING MANIFOLD	SET	1	BY HBP
2	SLUG CATCHER	SET	1	BY HBP
3	SEPARATOR AREA			EXISTING
4	PROCESS EQUIPMENT AREA			EXISTING
5	NEW PROCESS EQUIPMENT AREA			BY HBP
6	CCR (CENTRAL CONTROL ROOM)	SET	1	BY HBP
7	ELECTRICAL BUILDING	SET	1	BY HBP
8	POWER GENERATOR BUILDING	SET	1	BY HBP
9	LABORATORY	SET	1	BY OGDCI
10	LPG STORAGE BULLETS	SET	39	BY HBP
11	EXISTING CONDENSATE TANKS	SET	6	EXISTING
12	NEW CONDENSATE TANKS (FUTURE)	SET	2	BY OGDCI
13	PRODUCED WATER TREATMENT SYSTEM			BY HBP
14	FIRE WATER SYSTEM			BY HBP
15	RAW WATER TREATMENT SYSTEM			BY HBP
16	EVAPORATION POND	SET	1	BY HBP
17	M.P.E. & I WORK SHOP	SET	1	BY OGDCI
18	AUTO WORK SHOP	SET	1	BY OGDCI
19	MAINTENANCE WORK SHOP	SET	1	BY OGDCI
20	WAREHOUSE	SET	1	BY OGDCI
21	FIRE STATION	SET	1	BY OGDCI
22	SECURITY WATCH TOWER	Nos.	5	BY OGDCI
23	PIPE YARD (100m x 50m)	SET	1	BY OGDCI
24	NEW FLARE K.O. DRUM	SET	1	BY HBP
25	RELOCATED EXISTING API PIT	SET	1	BY OGDCI
26	EXISTING FLARE HEADER	SET	1	BY OGDCI
27	NEW FLARE STACK	SET	1	BY HBP
28	LOADING SYSTEM AREA	SET	1	BY OGDCI
29	LPG LOADING AREA	SET	1	BY HBP
30	NEW CONDENSATE GANTRY	SET	1	BY OGDCI
31	ADDITIONAL LAND FOR BOWSER PARKING	SET	1	BY OGDCI
32	ADMIN BUILDING	SET	1	BY OGDCI
33	CLINIC	SET	1	BY OGDCI
34	LPG PUMP SHED	SET	1	BY HBP
35	BOUNDARY WALL	SET	1	EXISTING
36	DIESEL STORAGE VESSEL	SET	1	BY HBP

REV.	DISCIPLINE	CHKD	PRPD	REVD	APPD	DATE
00	Approved for Construction	Zhang BP	Zhang XY	Liu Na	Cheng Xi	16/08/2016
C	Issued for Approval	Zhang BP	Zhang XY	Liu Na	Cheng Xi	14/06/2016
B	Issued for Review	Zhang BP	Zhang XY	Liu Na	Cheng Xi	01/06/2016
A	Internal Discipline Check	Zhang BP	Zhang XY	Liu Na	Cheng Xi	15/03/2016

CLIENT: OIL & GAS DEVELOPMENT COMPANY LTD.
OGDC HEADQUARTERS, HSEI FLOOR, AREA 8, BLUE AREA, JINBAH AVENUE ISLAMABAD PAKISTAN
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CONTRACTOR: HONG KONG HUIHUA GLOBAL TECHNOLOGY LIMITED
HONG KONG HUIHUA GLOBAL TECHNOLOGY LIMITED
 PROJECT NO. NASHPA 1247

PROJECT TITLE: NASHPA GAS PROCESSING AND LPG RECOVERY PLANT PROC-FG-CB-NASHPA/PROJ-1247/2015

DRAWING NO.: NGP-000-ELE-15.01-0004-00

DRAWING TITLE: EARTHING AND LIGHTNING PROTECTION LAYOUT

REV. SCALE SHEET: 00 1:1000 1 OF 1

Drawing Size: ISO A0



NASHPA Gas Processing and LPG Recovery Plant

PROC-FC-CB/NASHPA/PROJ-1247 /2015

PROJECT NO.: NASHPA 1247



DOCUMENT NO.:
NGP-000-ELE-15.02-0001-00

ELECTRICAL LOAD LIST

PAGE 1 OF 10

ELECTRICAL LOAD LIST

REVISION DETAILS

REV	DATE	DESCRIPTION	PRPD	CHKD	REVD	APPD
			<i>Liu Na</i>	<i>zhangxiyi</i>	<i>Bai Haijun</i>	<i>cheng xin</i>
00	05/12/2016	Approved for Design	Liu Na	Zhang Xlyi	Bai Haijun	Cheng Xin
C1	02/06/2016	Issued for Information	Liu Na	Zhang Xlyi	Bai Haijun	Cheng Xin
C	01/04/2016	Issued for Review	Liu Na	Zhang Xlyi	Bai Haijun	Cheng Xin
B	25/01/2016	Issued for Review	Liu Na	Zhang Xlyi	Bai Haijun	Cheng Xin
A	15/01/2016	Internal Discipline Check	Liu Na	Zhang Xlyi	Bai Haijun	Cheng Xin



NASHPA Gas Processing and LPG Recovery Plant
PROC-FC-CB/NASHPA/PROJ-1247 /2015

DOC. NO. NGP-000-ELE-15.02-0001-00

DESCRIPTION electrical load list

REVISION 00

PAGE 2 OF 10

REVISION HISTORY

REV.	DATE	REVISION DESCRIPTION
A	15/01/2016	Internal Discipline Check
B	25/01/2016	Issued for Review
C	01/04/2016	Issued for Review
C1	02/06/2016	Issued for Information
00	05/12/2016	Approved for Design

Equipment					Absorbed Load (A)	Motor Ratings/Operating load (B)	Load Factor (C)=A/B	Efficiency (D)	Power Factor	Load Consumption Type	kW=A/D		Consumed Load		kVA=kW*tanΦ		shedding load
ZEL Tag	Description	Voltage	Essential	Normal							Continuous (E)		Intermittent (E)		Stand-by (G)		
					kW	kW	In Decimals	%	COSΦ	C/S	kW	kVAr	kW	kVAr	kW	kVAr	
EA-2401A	De-Butanizer OVHD Condenser Air Cooler	0.4kV		X	14.99	18.5	0.81	0.86	0.83	C	17.4	11.7					
EA-2401B	De-Butanizer OVHD Condenser Air Cooler	0.4kV		X	14.99	18.5	0.81	0.86	0.83	C	17.4	11.7					
EA-2401C	De-Butanizer OVHD Condenser Air Cooler	0.4kV		X	14.99	18.5	0.81	0.86	0.83	C	17.4	11.7					
EA-2401D	De-Butanizer OVHD Condenser Air Cooler	0.4kV		X	14.99	18.5	0.81	0.86	0.83	C	17.4	11.7					
Propane Refrigeration Units																	
	Skid A oil pump A motor	0.4kV		X	4.02	5.50	0.73	0.82	0.82	C	4.9	3.4					X X X
	Skid A oil pump B motor	0.4kV		X	4.02	5.50	0.73	0.82	0.82	C	4.9	3.4					X X X
	Skid A separator oil heater	0.4kV		X	2.25	3.00	0.75	0.82	0.82	C	2.7	1.9					X X X
	Field PLC-A	0.23kV	X			5.00				0.8	0.0						X X X
	Skid B oil pump A motor	0.4kV		X	4.40	5.50	0.8	0.86	0.83	S					5.12	3.44	X X X
	Skid B oil pump B motor	0.4kV		X	4.40	5.50	0.8	0.86	0.83	S					5.12	3.44	X X X
	Skid B separator oil heater	0.4kV		X	2.25	3.00	0.75	0.82	0.82	S					2.74	1.92	X X X
	Field PLC-B	0.23kV	X			5.00				0.8					5.0	5.0	
EA-2405/1	Common skid condenser cooling fan VF motor 1	0.4kV		X	8.80	11.00	0.8	0.86	0.83	C	10.2	6.9					X X X
EA-2405/2	Common skid condenser cooling fan VF motor 2	0.4kV		X	8.80	11.00	0.8	0.86	0.83	C	10.2	6.9					X X X
EA-2405/3	Common skid condenser cooling fan motor 1	0.4kV		X	8.80	11.00	0.8	0.86	0.83	C	10.2	6.9					X X X
EA-2405/4	Common skid condenser cooling fan motor 2	0.4kV		X	8.80	11.00	0.8	0.86	0.83	C	10.2	6.9					X X X
	Common skid condenser VF motor 1 auxiliary cooling fan	0.4kV		X	0.17	0.23	0.75	0.82	0.82	C	0.2	0.1					X X X
	Common skid condenser VF motor 2 auxiliary cooling fan	0.4kV		X	0.17	0.23	0.75	0.82	0.82	C	0.2	0.1					X X X
P-2405/1	Common skid condenser water pump motor 1	0.4kV		X	12.15	15.00	0.81	0.88	0.83	C	13.8	9.3					X X X
P-2405/2	Common skid condenser water pump motor 2	0.4kV		X	12.15	15.00	0.81	0.88	0.83	C	13.8	9.3					X X X
	Common skid evaporator oil collector electrical heater tracing	0.23kV		X	1.50	2.00	0.75	0.82	1	C	1.8	0.0					X X X
Sale Gas Compressor unit																	
EA-2502A	Sale Gas Compressor evaporative Air Cooler	0.4kV		X	12.15	15	0.81	0.88	0.83	C	13.8	12.8					
EA-2502B	Sale Gas Compressor evaporative Air Cooler	0.4kV		X	12.15	15	0.81	0.88	0.83	C	13.8	12.8					
P-2510/1	spray pump skid	0.4kV		X	2.25	3	0.75	0.82	0.82	C	2.74	1.92					
P-2510/2	spray pump skid	0.4kV		X	2.25	3	0.75	0.82	0.82	C	2.74	1.92					
P-2510/3	spray pump skid	0.4kV		X	2.25	3	0.75	0.82	0.82	C	2.74	1.92					
Storage And Loading Units panel																	
006-DB-002	Sub Distribution panel-LPG Pump Shed	0.4kV		X						0.85			82.5	51.1			X X X
including:																	
P-2702A	OFF SPEC LPG Transfer Pump	0.4kV		X	8.80	11	0.8	0.86	0.83	I							
P-2702B	OFF SPEC LPG Transfer Pump	0.4kV		X	8.80	11	0.8	0.86	0.83	S							
P-2701A	LPG Loading Pump	0.4kV		X	24.60	30	0.82	0.9	0.83	I							
P-2701B	LPG Loading Pump	0.4kV		X	24.60	30	0.82	0.9	0.83	I							
P-2701C	LPG Loading Pump	0.4kV		X	24.60	30	0.82	0.9	0.83	S							
P-2801A	Propane Loading Pump	0.4kV		X	6.00	7.5	0.8	0.86	0.83	I							
P-2801B	Propane Loading Pump	0.4kV		X	6.00	7.5	0.8	0.86	0.83	S							
Assist Production Unit																	
P-4101A	Methanol Injection Pump A	0.4kV		X	3.00	4	0.75	0.82	0.82	I			3.66	2.55			X X X
P-4101B	Methanol Injection Pump B	0.4kV		X	3.00	4	0.75	0.82	0.82	S					3.66	2.55	X X X
P-3301A	Stop Pump	0.4kV		X	8.80	11	0.8	0.86	0.83	I			10.23	6.88			X X X
P-3301B	Stop Pump	0.4kV		X	8.80	11	0.8	0.86	0.83	S					10.23	6.88	X X X
	LPG odorizer unit panel	0.4kV	X		0.54	0.72	0.75	0.82	0.82	I			0.66	0.46			
Hot Oil System																	
Hot Oil Electrical Control Panel UCP-3100-E/A																	
including:																	
B-3101A	Hot Oil Fired Heater Blower	0.4kV		X	12.15	15	0.81	0.88	0.83	C	13.81	9.28					
P-3102	Hot oil fill pumps	0.4kV		X	12.15	15	0.81	0.88	0.83	I			13.81	9.28			
	Hot Oil Electrical Control Panel UCP-3100-E/B	0.23V	X			0	1			0.8	0.00	0.00					
including:																	
P-3101A	Hot Oil Circulation Pump	0.4kV		X	140.80	160	0.88	0.93	0.89	C	151.40	77.56					
B-3101B	Hot Oil Fired Heater Blower	0.4kV		X	12.15	15	0.81	0.88	0.83	C	13.81	9.28					
	Hot Oil Electrical Control Panel UCP-3100-E/C		X			0	1			0.8	0.00	0.00					
including:																	
P-3101B	Hot Oil Circulation Pump	0.4kV		X	140.80	160	0.88	0.93	0.89	C	151.40	77.56					
B-3101C	Hot Oil Fired Heater Blower	0.4kV		X	12.15	15	0.81	0.88	0.83	S					13.81	9.28	
	Hot Oil Electrical Control Panel UCP-3100-E/D		X			0	1			0.8	0.00	0.00					
including:																	
P-3101C	Hot Oil Circulation Pump	0.4kV		X	140.80	160	0.88	0.93	0.89	S					151.40	77.56	
B-3101D	Hot Oil Fired Heater Blower	0.4kV		X	12.15	15	0.81	0.88	0.83	S					13.81	9.28	
	Load of UPS	0.4kV	X			96	1			0.8	96.00	72.00					

Attachment - 2 Essential load list

Equipment					Absorbed Load (A)	Motor Ratings/Operating load (B)	Load Factor (C)=A/B	Efficiency (D)	Power Factor	Load Consumption Type	kW=A/D		Consumed Load		kVar=kW*tanΦ		shedding load
ZEL Tag	Description	Voltage	Essential	Normal							Continuous (E)		intermittent (E)		Stand-by (G)		
											kW	kVar	kW	kVar	kW	kVar	
	1# Distribution panel in sound attenuation container	0.4kV	X						0.8	C	18.00	13.50					
	1# gas generator Parallel control panel	0.23kV	X						0.8	I			15.00	11.3			
	including:																
	Jacket Water Heater	0.23kV	X		7.20	9	0.8	0.86	1	I							
	Alternator Space Heater	0.23kV	X		1.50	2	0.75	0.82	1	I							
	Pre-Lube Pump	0.23kV	X		1.50	2	0.75	0.82	0.82	I							
	Fire Extinguishing System	0.23kV	X		1.50	2	0.75	0.82	0.82	I							
	Fire Extinguishing System	0.23kV	X		1.50	2	0.75	0.82	0.82	I							
	1# Radiator fan panel	0.4kV	X														
	including:																
	Radiator Fan(power:2.2kW set:12)	0.4kV	X		1.65	2.2	0.75	0.82	0.82	C	26.40	18.4					
	2# Distribution panel in sound attenuation container	0.4kV	X						0.8	C	18.00	13.50					
	2# gas generator Parallel control panel	0.4kV	X						0.8	I			15.00	11.3			
	including:																
	Jacket Water Heater	0.23kV	X		7.20	9	0.8	0.86	1	I							
	Alternator Space Heater	0.23kV	X		1.50	2	0.75	0.82	1	I							
	Pre-Lube Pump	0.23kV	X		1.50	2	0.75	0.82	0.82	I							
	Fire Extinguishing System	0.23kV	X		1.50	2	0.75	0.82	0.82	I							
	Fire Extinguishing System	0.23kV	X		1.50	2	0.75	0.82	0.82	I							
	2# Radiator fan panel	0.4kV	X														
	including:																
	Radiator Fan(power:2.2kW set:12)	0.4kV	X		1.65	2.2	0.75	0.82	0.82	C	26.40	18.4					
	3# Distribution panel in sound attenuation container	0.4kV	X						0.8	S					18.00	13.50	
	3# gas generator Parallel control panel	0.4kV	X						0.8	S					15.00	11.3	
	including:																
	Jacket Water Heater	0.23kV	X		7.20	9	0.8	0.86	1	S							
	Alternator Space Heater	0.23kV	X		1.50	2	0.75	0.82	1	S							
	Pre-Lube Pump	0.23kV	X		1.50	2	0.75	0.82	0.82	S							
	Fire Extinguishing System	0.23kV	X		1.50	2	0.75	0.82	0.82	S							
	Fire Extinguishing System	0.23kV	X		1.50	2	0.75	0.82	0.82	S							
	3# Radiator fan panel	0.4kV	X														
	including:																
	Radiator Fan(power:12kW set:12)	0.4kV	X		1.65	2.2	0.75	0.82	0.82	C					26.4	18.4	
	Diesel engine generator Auxiliary electricity panel	0.4kV	X						0.8	C	15.0	11.3					
	including:																
	Jacket water heater	0.23kV	X		6.75	9	0.75	0.86	1	C							
	Alternator space heater	0.23kV	X		0.75	1	0.75	0.82	1	C							
	fire extinguishing system	0.23kV	X		1.50	2	0.75	0.82	0.82	C							
	fire extinguishing system	0.23kV	X		1.50	2	0.75	0.82	0.82	C							
	Watch towers(5 NOS.)	0.4kV	X						0.85	C	10.00	6.2					
	Load of UPS	0.4kV	X						0.8	C	96.00	72.00					
	Electrical Building 010-EDB-002 (Lighting and Ventilator)	0.4kV	X						0.85	I			6.3	3.90			
	Electrical Building 010-EDB-003(Lighting and Ventilator)	0.4kV	X						0.85	I			1.2	0.74			
	Electrical Building 010-EDB-004 (HVAC)	0.4kV	X						0.85	C	30	18.59					
	Electrical Building 010-EDB-005 (HVAC)	0.4kV	X						0.85	C	6	3.72					



Equipment					Absorbed Load (A)	Motor Ratings/Operating load (B)	Load Factor (C)=A/B	Efficiency (D)	Power Factor	Load Consumption Type	kW=A/D		Consumed Load		kVA=kW*tanΦ		shedding load
ZEL Tag	Description	Voltage	Essential	Normal							Continous (E)		intermittent (E)		Stand-by (G)		
											kW	kVA	kW	kVA	kW	kVA	
	Electrical Building 010-EDB-006(Lighting and Ventilator)	0.4kV	X					0.85	I			6	3.72				
	Electrical Building 010-EDB-007(Lighting and Ventilator)	0.4kV	X					0.85	I			6	3.72				
SPAC-001A	CCR-Control Box of the Package Air Condition Units	0.4kV	X					0.85	C	90.00	55.78						
SPAC-001B	CCR-Control Box of the Package Air Condition Units	0.4kV	X					0.85	S					90.00	55.78		
010-EDB-01	Sub Distribution panel-CCR (Lighting fixture,axial fan)	0.4kV	X					0.85	I			25.00	15.49				
001-EDB-004	Sub Distribution panel-process area lighting	0.4kV	X					0.85	I			4.50	2.79				
001-EDB-802	Sub Distribution panel-lighting	0.4kV	X					0.85	I			3.00	1.86				
001-EDB-005	compressor room	0.4kV	X					0.85	I			4.00	2.48				
001-EDB-501	Sub Distribution panel-hot oil system(lighting)	0.4kV	X					0.85	I			1.00	0.62				
K-3401A/B	MCC-K-3401A/B Instrument Air Compressor panel	0.4kV	X														
	including:																
	Air compressor A	0.4kV	X		65.25	75.00	0.87	0.92	0.87	I		70.92	40.19				
	Air compressor B	0.4kV	X		65.25	75.00	0.87	0.92	0.87	I		70.92	40.19				
	Space heater A	0.23	X		2.25	3.00	0.75	0.82	1	I		2.74	0.00				
	Space heater B	0.23	X		2.25	3.00	0.75	0.82	1	I		2.74	1.92				
	Air cooler A	0.23	X		0.29	0.38	0.75	0.82	0.82	I		0.35	0.24				
	Air cooler B	0.23	X		0.29	0.38	0.75	0.82	0.82	I		0.35	0.24				
	Dryer	0.23	X		0.30	0.40	0.75	0.82	0.82	I		0.37	0.26				
	Nitrogen generator	0.23	X		0.30	0.40	0.75	0.82	0.82	I		0.37	0.26				
	spare	0.23	X		2.25	3.00	0.75	0.82	0.82	I		2.74	1.92				
	Inlet power	0.23	X		0.38	0.50	0.75	0.82	0.82	I		0.46	0.32				
	Flare System																
009-EDB-001	Sub Distribution panel-Flare System Powe		X						0.85		45.00	27.89					
	including																
E-3201	Flare electrical heater	0.4kV	X		24.60	30	0.82	0.9	1	C							
P-3201 A	Flare Knockout drum pumps	0.4kV	X		8.80	11	0.8	0.86	0.83	C							
P-3201 B	Flare Knockout drum pumps	0.4kV	X		8.80	11	0.8	0.86	0.83	S							
FS-3201	Flare Ignition Panel (Power supplied by UPS)	0.4kV	X		0.00	2											
MCC-P-3501A	Main Fire Water Pumps(Motor Driven) Electrical Control Panel	0.4kV	X		88.00	100	0.88	0.93	0.88	C	94.62	51.07					
MCC-P-3501B	Main Fire Water Pumps(Motor Driven) Electrical Control Panel	0.4kV	X		88.00	100	0.88	0.93	0.88	C	94.62	51.07					
P-3502	Main fire water pumps(deisel engine driver)	0.4kV	X		1.50	2	0.75	0.82	0.75	C	1.83	1.61					
MCC-PU-3501	Jockey Pump Skid (PU-3501)								0.83				18.50	12.43			
	Including:																
P-3503A	Jockey pumps	0.4kV	X		14.99	18.5	0.81	0.86	0.83	I							
P-3503B	Jockey pumps	0.4kV	X		14.99	18.5	0.81	0.86	0.83	S							

Equipment					Absorbed Load (A)	Motor Ratings/Operating load (B)	Load Factor (C)=A/B	Efficiency (D)	Power Factor	Load Consumption Type	kW=A/D		Consumed Load		kVar=kW*tanΦ		shedding load	
ZEL Tag	Description	Voltage	Essential	Normal							Continous (E)		intermittent (E)		Stand-by (G)			
					kW	kW	In Decimals	%	COSΦ	C//S	kW	kVAr	kW	kVAr	kW	kVAr		
MCC-PU-3502	Foam Injection Skid Electrical Control Panel	0.4kV	X		16.40	20	0.82	0.86	0.83	C	19.07	12.81						
007-EDB-001	Sub Distribution panel-Fire Fighting Shed Lighting EDB	0.4kV	X						0.85	I			4.00	2.48				
001-EDB-101	Sub Distribution panel-04A (Lighting fixture)	0.4kV	X						0.85	I			4.00	2.48				
004-EDB-002	Sub Distribution panel-Dehydration (Mol.Sieve) Unit	0.4kV	X						0.85	I			1.50	0.93				
	Optional building load (011-SDB-001-006)	0.4kV		X					0.85	C	250.00	168.00						
NORMAL AND ESSENTIALTOTAL											554.95	375.85	247.46	161.68	149.40	98.95		
NORMAL AND ESSENTIAL TOTAL WITH DIVERSITY FACTOR OF 0.5 / 0.1											554.95	375.85	123.73	80.84	14.94	9.90		
Notes:																		
1	Multiplication Factor for Continuous Load = 100%																	
2	Multiplication Factor for Intermittent Load = 50%																	
3	Multiplication Factor for Stand by Load = 10%(Normal)																	
4	Normal Operation Load(Maximum) =100% of Continuous Load + 50% of Intermittent Load																	
5	Normal Operation Load(Peak) = 100% of Continuous Load + 50% of Intermittent Load + 10% of Standby Load																	
6	The optional building loads should be blackout when the two main fire water pumps(motor driven) is running.So the essential continuous loads don't include the optional building loads																	