OIL INDIA LIMITED
(A Government of India Enterprises)
PO : Duliajan – 786602
Assam (India)

TELEPHONE NO. 91-33 22301657/59
FAX NO: 91 33 22302596
Email: oilcalmn@oilindia.in ; erp_mm@oilindia.in

FORWARDING LETTER

Tender No. : **SKI0407P14** **Date 04.07.2013**

Tender Fee : **Rs 1,000.00**

Bid Security Amount : **Rs. 1,64,250.00**

Bidding Type : **SINGLE STAGE TWO BID SYSTEM**

Bid Closing on : **As mentioned in the e-portal**

Bid Opening on : **As mentioned in the e-portal**

Performance Security : **Applicable**

Integrity Pact : **Applicable**

Date of pre-bid conference : 29.08.2013 & 30.08.2013

Venue of pre-bid conference : GUWAHATI, ASSAM.

OIL invites Bids for ***UP-GRADATION & AUGEMENTATION OF PROCESS MONITORING SYSTEM FOR MAKUM OCS*** through its e-Procurement site under **SINGLE STAGE TWO BID SYSTEM**. The bidding documents and other terms and conditions are available at Booklet No. MM/CALCUTTA/E-01/2010. The prescribed Bid Forms for submission of bids are available in the Technical RFx -> External Area - > Tender Documents .

The general details of tender can be viewed by opening the RFx [Tender] under RFx and Auctions.. The details of items tendered can be found in the Item Data and details uploaded under Technical RFX.

Note:-

(1) A Pre-Bid Conference with the Parties will be held in Guwahati (India) on 29.08.2013 & 30.08.2013 to discuss on the technical specifications and other terms and conditions of the tender. All the Parties who purchase the Tender Document (User ID and Password) within the Last date of Tender Fee Payment i.e. 14.08.2013 (or amended otherwise) will be eligible to attend the Pre-Bid Conference. The exact venue and time of the Pre-Bid conference will be intimated to the Parties at a later date.

(2) Clarification on the technical specifications and other terms & conditions of the tender shall be provided to the parties during the Pre-bid Conference. Parties should come fully prepared to the Pre-bid Conference and submit their queries to OIL in the Pre-bid Conference for clarification. The set of queries may also be sent to OIL at least 7 (seven) days before the Pre-bid Conference for study by OIL. At the most 2 (Two) representatives from each party shall be allowed to participate in the pre-bid conference. All costs for attending the pre-bid conference shall be to the bidder's account.

(3) Any changes in the technical specifications and other terms & conditions of the tender arising out of discussion in the Pre -bid Conference shall also form part of the tender document.

(4) Parties, immediately after the USER ID AND PASSWORD, shall inform OIL at the following address about their participation in the Pre-Bid Conference with details of the persons to enable OIL to make arrangement for the Pre-Bid Conference.

Head-Calcutta Branch,
Oil India Limited,
4, India Exchange Place,
Kolkata – 700 001.
TELEPHONE NO. (033) 222301657
FAX NO: (033) 22302596
Email: oilcalmn@dataone.in;oilcalmn@oilindia.in

<u>The tender will be governed by</u>:

a) "General Terms & Conditions" for e-Procurement as per Booklet No. MM/CALCUTTA/E-01/2010 for E-Procurement LCB Tenders and Amendment No. 1 to General Terms and Conditions for Indigenous E-Tender.

b) Technical specifications and Quantity as per **Annexure – 1I and following tender documents.**

1) Detailed technical specification
2) P&I diagram for each equipement with Tag numbers are attached as ppt.
3)EXISTING CONTROL ROOM LAYOUT.
4)EXISTING SYSTEM CONFIGURATION

c) The prescribed Bid Forms for submission of bids are available in the Technical RFx -> External Area - > Tender Documents.

d) In the event of receipt of only a single offer against the tender within B.C. date, OIL reserves the right to extend the B.C. date as deemed fit by the Company. During the extended period, the bidders who have already submitted the bids on or before the original B.C. date, shall not be permitted to revise their quotation.

e) Any sum of money due and payable to the contractor (including Security Deposit refundable to them) under this or any other contract may be appropriated by Oil India Limited and set-off against any claim of Oil India Limited (or such other person or persons contracting through Oil India Limited) for payment of sum of money arising out of this contract or under any other contract made by the contractor with Oil India Limited (or such other person or persons contracting through Oil India Limited).

f) Bidder are advised to fill up the Technical bid check list and Response sheet given in MS excel format in Technical RFx -> External Area - > Tender Documents. The above filled up document to be uploaded in the Technical RFX Response.

Special Note:

1.0 General Qualification Criteria:

In addition to the general BRC/BEC, following criteria on Bidders' Experience and their financial capabilities shall be considered **(documentary evidence to be provided along with the bid in** Technical RFx -> External Area - > Tender Documents**)** as on the Bid Closing Date:

a) Bidder should have experience of successfully executing similar order of **Rs.49.27Lakhs** during last 3 years.

b) Annual financial turnover of the firm in any of the last 3 financial years or current financial year should not be less than **Rs. 1.64 CRORES.**

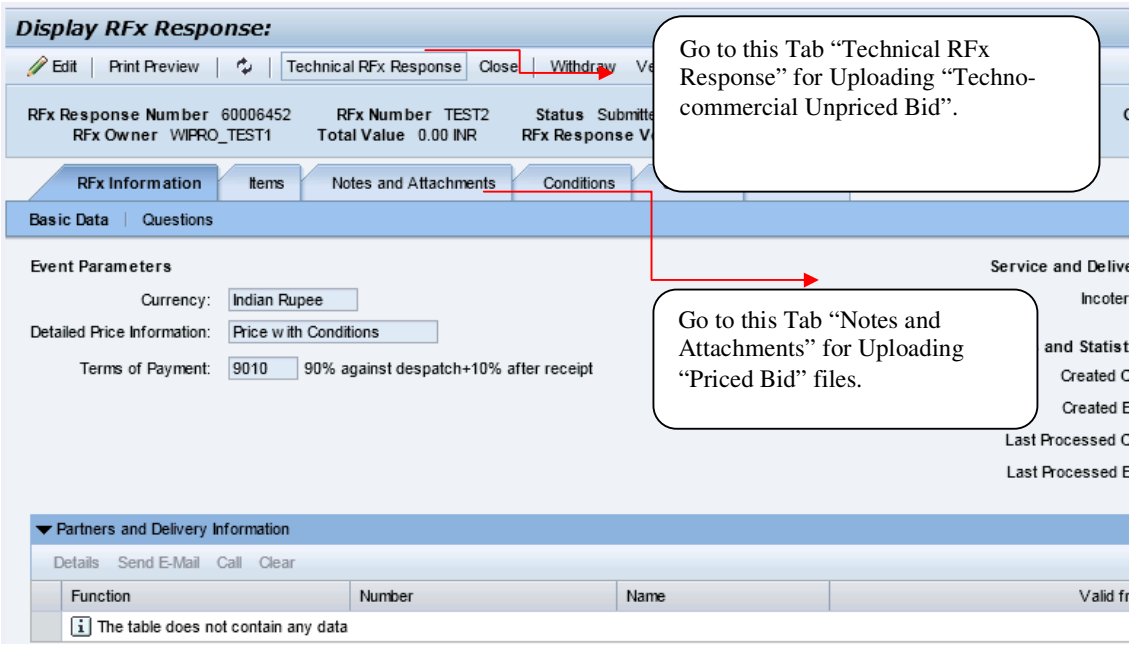
2.0 Application showing full address / e-mail address with Tender fee (non-refundable) of ₹ 1000.00 per tender (excepting PSU and SSI units registered with NSIC) by Demand Draft in favour of M/s. Oil India Limited payable at Kolkata and to be sent to Head-Calcutta Branch, Oil India Limited, 4, India Exchange Place, Kolkata – 700 001. **Application shall be accepted only upto 14.08.2013 (or as amended in e-portal).**The envelope containing the application for participation should clearly indicate ""REQUEST FOR ISSUE OF USER ID AND PASSWORD FOR E TENDER NO **SKI9952P14** for easy identification and timely issue of authorisation. On receipt of requisite tender fee and subject to fulfilment of eligibility criteria, USER_ID and initial PASSWORD will be communicated to the bidder (through-e-mail) and will be allowed to participate in the tender through OIL's e-Procurement portal. No physical tender documents will be provided. USER_ID AND INITIAL PASSWORD WILL BE ISSUED TILL **15.08.2013**

3.0 The tender is invited under SINGLE STAGE-TWO BID SYSTEM. The bidders are required to submit both the "TECHNO-COMMERCIAL UNPRICED BID" and "PRICED BID" through electronic format in the OIL's e-Tender portal within the Bid Closing Date and Time stipulated in the e-Tender.

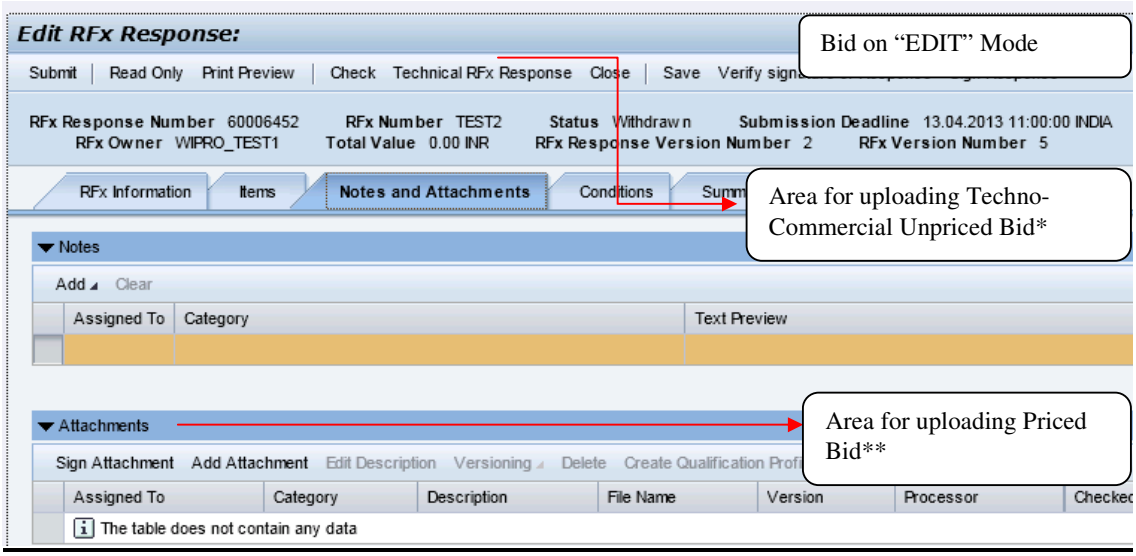
3.1 Please ensure that Technical Bid / all technical related documents related to the tender are uploaded in the Technical RFx Response-> User - > Technical Bid only**.** The "**TECHNO-COMMERCIAL UNPRICED BID**" shall contain all techno-commercial details **except the prices**. **Please note that no price details should be uploaded in** Technical RFx Response**.**

3.2 The "**PRICE BID**" must contain the price schedule and the bidder's commercial terms and conditions.**The prices of the items should be quoted in "Conditions Tab". The prices of the items should be quoted in "Conditions Tab". Details of prices as per Bid format / Commercial bid can be uploaded as Attachment under the attachment option under "Notes & Attachments"**

3.3 A screen shot in this regard is given below. Offer not complying with above submission procedure will be rejected as per Bid Rejection Criteria .



On "EDIT" Mode- The following screen will appear. Bidders are advised to Upload "Techno-Commercial Unpriced Bid" and "Priced Bid" in the places as indicated above:



Note :

* The "Techno-Commercial Unpriced Bid" shall contain all techno-commercial details **except the prices**.

** The "Price bid" must contain the price schedule and the bidder's commercial terms and conditions. For uploading Price Bid, first click on Sign Attachment, a browser window will open, select the file from the PC and click on Sign to sign the Sign. On Signing a new file with extension .SSIG will be created. Close that window. Next click on Add Atachment, a browser window will open, select the .SSIG signed file from the PC and name the file under Description, Assigned to General Data and clock on OK to save the File.

4.0 Please note that all tender forms and supporting documents are to be submitted through OIL's e-Procurement site only except following documents which are to be submitted manually in sealed envelope super scribed with Tender no. and Due date to Head-Calcutta Branch, Oil India Limited, 4, India Exchange Place, Kolkata – 700 001 only on or before the Bid Closing Date and Time mentioned in the Tender.

a) Original Bid Security
b) Detailed Catalogue (if any)
c) Any other document required to be submitted in original as per tender requirement
All documents submitted in physical form should be signed on all pages by the authorised signatory of the bidder and to be submitted in triplicate

5.0 Bidders are requested to examine all instructions, forms, terms and specifications in the bid. Failure to furnish all information required as per the NIT or submission of offers not substantially responsive to the bid in every respect will be at the bidders risk and may result in rejection of its offer without seeking any clarifications.

6.0 **All the Bids must be Digitally Signed using "Class 3" digital certificate with Organisation's name *(e-commerce application)* as per Indian IT Act obtained from the licensed Certifying Authorities operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India. The bid signed using other than "Class 3 with Organisation's Name" digital certificate, will be rejected.**

7.0 Bidders must ensure that their bid is uploaded in the system before the tender closing date and time. Also, they must ensure that above documents which are to be submitted in a sealed envelope are also submitted at the above mentioned address before the bid closing date and time failing which the offer shall be rejected.

8.0 Bid must be submitted electronically only through OIL's e-procurement portal. Bid submitted in any other form will be rejected.

9.0 **SINGLE STAGE TWO BID SYSTEM** shall be followed for this tender and only the PRICED-BIDS of the bidders whose offers are commercially and technically acceptable shall be opened for further evaluation.

10.0 **a) The Integrity Pact is applicable against this tender. OIL shall be entering into an Integrity Pact with the bidders as per format enclosed vide Annexure-V of the tender document. This Integrity Pact proforma has been duly signed digitally by OIL's competent signatory. The proforma has to be returned by the bidder (along with the technical bid) duly signed (digitally) by the same signatory who signed the bid, i.e., who is duly authorized to sign the bid. Any bid not accompanied by Integrity Pact Proforma duly signed (digitally) by the bidder shall be rejected straightway. Uploading the Integrity Pact with digital signature will be construed that all pages of the Integrity Pact has been signed by the bidder's authorized signatory who sign the Bid.**

b) The name of the OIL's Independent External Monitors at present are as under:

i) SHRI N. GOPLASWAMI, I.A.S. (Retd.),
Former Chief Election Commissioner of India
E-mail Id : gopalaswamin@gmail.com

ii) SHRI RAMESH CHANDRA AGARWAL, IPS (Retd.)
Former Director General of Police
E-mail Id : rcagarwal@rediffmail.com

13.0 The tender shall be governed by the Bid Rejection & Bid Evaluation Criteria given in enclosed Annexure-II. However, if any of the Clauses of the Bid Rejection Criteria / Bid Evaluation Criteria contradict the Clauses of the tender and / or "General Terms & Conditions" as per Booklet No. MM/CALCUTTA/E-01/2010 for E procurement (LCB Tenders) to General Terms and Conditions for Indigenous E-Tender elsewhere, those in the BEC / BRC shall prevail.

14.0 To ascertain the substantial responsiveness of the bid OIL reserves the right to ask the bidder for clarification in respect of clauses covered under BRC also and such clarifications fulfilling the BRC clauses in to must be received on or before the deadline given by the company, failing which the offer will be summarily rejected.

15.0 Please do refer the User Manual provided on the portal on the procedure How to create Response for submitting offer.

NOTE:

1. Bidders should submit their bids explicitly mentioning compliance / non compliance to all the NIT terms and conditions.

Yours Faithfully
(B BHARALI)
SENIOR PURCHASE OFFICER
FOR HEAD-CALCUTTA BRANCH
OIL INDIA LTD. KOLKATA

TELEPHONE NO. (033) 2230 1657 / 58 / 59
FAX NO: (91-033) 2230 2596
Email : oilcalmn@oilindia.in
oilcalmn@dataone.in

ANNEXURE-II

Tender no. SKI0407P14 Dated: 04.07.2013

OIL INDIA LIMITED invites Indigenous tenders for items detailed below:

TECHNICAL SPECIFICATIONS WITH QUANTITY

SLNO & MATERIAL CODE NO.	MATERIAL DESCRIPTION.	QUANTITY	UNIT
10 ---------- 0C000334	***UP-GRADATION & AUGEMENTATION OF PROCESS MONITORING SYSTEM FOR MAKUM OCS.*** The tender consist of following documents **1) Detailed technical specification (Refer Annexure II-A)** **2) P&I diagram for each equipment with Tag numbers are attached as ppt. (Refer Annexure II-B)** **3)EXISTING CONTROL ROOM LAYOUT. (Refer Annexure II-C)** **4)EXISTING SYSTEM CONFIGURATION. (Refer Annexure II-D)**	01	No.
20 ----------	**Installation & Commissioning**	01	AU

I)BID REJECTION CRITERIA (BRC)

The following BRC/BEC will govern the evaluation of the bids received against this tender. Bids that do not comply with stipulated BRC/BEC in full will be treated as non responsive and such bids shall prima-facie be rejected. Bid evaluation will be done only for those bids that pass through the "Bid Rejection Criteria" as stipulated in this document.

Other terms and conditions of the enquiry shall be as per General Terms and Conditions vide MM/CALCUTTA/E-01/2010 for E-Procurement LCB Tenders. However, if any of the Clauses of the Bid Rejection Criteria / Bid Evaluation Criteria (BRC / BEC) contradict the Clauses of the tender or MM/CALCUTTA/E-01/2010 elsewhere, those in the BRC / BEC shall prevail.

(A) TECHNICAL :

1.1. BIDDERS must be in the relevant business of supply of Data acquisition and Control systems (DCS/PLC) and Oil field Instruments for a period of at least last 5 (five) years preceding from the Bid Closing date. BIDDERS are required to produce documentary evidence for the same in the prescribed format as given in Section E-4.

1.2. At least TWO (2) Nos. installations of similar system offered by the BIDDER should have been engineered by the SUPPLIER or his principal and in continuous operation for a period of at least two years from the Bid Closing date. Out of the two mentioned system one system must be of minimum value of **Rs.49.27Lakhs**.Documentary evidence to support the same to be produced.

Note: Similar system stands for up-grade/augmentation jobs related to process control instrumentation using DCS/PLC systems in oil & gas industries.

1.3. The SUCCESSFUL BIDDER will be required to submit DGMS (Director General of Mines safety), Dhanbad, India's valid approval certificate for all the field instruments (as per para 7.3 of Section C) along with supply. Bidders are required to confirm in writing in their bid for submission of the same along with the supply in the event of an order on them.

1.4. The BIDDER shall furnish along with the bid, the information called for in CHECK LIST (Section E2), Data sheets (Section D) and various schedules in section E in the prescribed format only, failing which the bid will be considered incomplete and OIL INDIA LIMITED (OIL) reserves the right to reject the bid.

1.5. The bid shall be in accordance with the specification and shall be complete in all respects. The bidder shall clearly indicate in his offer the list of deviations on a separate sheet (refer section E-3) even though these may be mentioned somewhere else in the quotation.

1.6. The SUPPLIERS are required to forward system configuration details with interconnection diagrams, equipment layout diagram in the field & control room and detailed technical literature of each equipment/system along with the quotation; otherwise the offers will be rejected.

B) COMMERCIAL:

1. Bidders are required to submit their offer under Single stage "Two Bid System". Bidders have to submit both the "Techno-commercial Unpriced Bids" and "Priced Bids" through electronic form in the OIL's e-Tender portal within the bid Closing date and time stipulated in the e-tender. The Techno-commercial Unpriced bid is to be submitted as per scope of works and Technical specification of the tender and the priced bid as per the online Commercial bid format. For details of submission procedure, please refer relevant para of General Terms and Conditions vide MM/CALCUTTA/E-01/2010 for E-Procurement LCB Tenders. Any offer not complying with the above mentioned procedure, will be rejected straightway.

a. Bid Security :

Bid security of **Rs 1,64,250.00 (Rupees One Lakh sixty four thousand two hundred fifty) only** shall be submitted manually in sealed envelope superscribed with Tender no._ and Bid Closing date to HEAD-CALCUTTA BRANCH, Oil India Limited, 4, India Exchange Place, Kolkata - 700001 on or before the Bid Closing Date and Time mentioned in the Tender. If bid security in ORIGINAL of above mentioned amount is not received within bid closing date and time, the bid submitted through electronic form will be rejected without any further consideration. For exemption for submission of Bid Security, please refer relevant Clause of General Terms and Conditions vide MM/CALCUTTA/E-01/2010 for E-Procurement LCB

Tenders. **The Bid Security shall be valid for 10 months (date shall be put during tendering) from the date of bid opening.**

b. Performance Bank Guarantee:

Successful bidder will be required to furnish a Performance Bank Guarantee @10% of the order value. For exemption for submission of Performance Bank Guarantee, please refer relevant Clause of MM/CALCUTTA/E-01/2010. Performance Bank Guarantee shall be valid for 12 months from the date of commissioning or 18 months from the date of despatch whichever concludes earlier.

c. The Bank Guarantee should be allowed to be encashed at all branches within India.

d. Validity of the bid shall be minimum 120 days from the Bid Closing Date. Bids without minimum validity shall be rejected.

e. The prices offered will have to be firm through delivery and not subject to variation on any account. A bid submitted with an adjustable price will be treated as non-responsive and rejected.

f. Bids received after the bid closing date and time will be rejected. Similarly, modifications to bids received after the bid closing date & time will not be considered.

g. All the Bids must be Digitally Signed using "Class 3" digital certificate *(e-commerce application)* as per Indian IT Act obtained from the licensed Certifying Authorities operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India. The bid signed using other than "Class 3" digital certificate, will be rejected.

h. Technical RFx Response folder is meant for Technical bid only. Therefore, No price should be given in Technical RFx Response folder, otherwise the offer will be rejected.

i. Price should be maintained in the "online price schedule" only. The price submitted other than the "online price schedule" shall not be considered.

vii) **INTEGRITY PACT:**

OIL shall be entering into an Integrity Pact with the bidders as per format enclosed vide Annexure V of the tender document. This Integrity Pact proforma has been duly signed digitally by OIL's competent signatory. The proforma has to be returned by the bidder (along with the technical bid) duly signed (digitally) by the same signatory who signed the bid, i.e., who is duly authorized to sign the bid. Any bid not accompanied by Integrity Pact Proforma duly signed (digitally) by the bidder shall be rejected straightway. Uploading the Integrity Pact with digital signature will be construed that all pages of the Integrity Pact has been signed by the bidder's authorized signatory who sign the Bid.

The names of the OIL's Independent External Monitors at present are as under:

i. SHRI N. GOPLASWAMI, I.A.S. (Retd.),
Former Chief Election Commissioner of India
E-mail Id: gopalaswamin@gmail.com

ii. SHRI RAMESH CHANDRA AGARWAL, IPS (Retd.)
Former Director General of Police
E-mail Id: rcagarwal@rediffmail.com

2. **Payment : Payment shall be made to the supplier as follows :**

a. 70% of the cost of the equipment shall be paid against dispatch documents of the main equipment provided the DGMS approval copy for all field instruments are provided along with the dispatch documents. The DGMS approval copy has to be valid for a period of minimum six months from the date of dispatch of the respective item. If any item is dispatched with DGMS field trail permission copy then only 50% payment with respect to value of that item will be released on delivery of that item and the remaining

amount will be paid only after providing the valid DGMS approval against that particular item. **

b. Balance 30% of the equipment cost along with the commissioning charges shall be paid after successful commissioning of the entire equipment.

Notes (****):

i. Materials where DGMS approval is required, payment to the extent of 50% of the material cost will be released on proof of dispatch alongwith the proof of submission of DGMS Field Trial, if valid DGMS approval is not submitted along with bid or during Inspection for dispatch clearance.

ii. Balance 50% of material value along with the installation and commissioning charges, if any, to be released only after successful commissioning and after obtaining DGMS Certificate of the equipment. A system will be considered as successfully commissioned only after obtaining valid DGMS approval for all the constituent equipment/instruments of the system.

Offers not complying with the above shall be rejected.

(II) BID EVALUATION CRITERIA (BEC) :

The bids conforming to the technical specifications, terms and conditions stipulated in the tender and considered to be responsive after subjecting to the Bid Rejection Criteria as well as verification of original of any or all documents/ documentary evidences pertaining to BRC will be considered for further evaluation as per the Bid Evaluation Criteria given below.

(A) TECHNICAL :

1. All materials as indicated in the tender should be offered. If any of the items not offered by the bidder, the offer will not be considered for evaluation.

(B) COMMERCIAL :

a. To evaluate the inter-se-ranking of the offers, Assam Entry Tax on purchase value will be loaded as per prevailing Govt. of Assam guidelines as applicable on bid closing date. Bidders may check this with the appropriate authority while submitting their offer.

b. In the event of computational error between the unit price and total price, unit price shall prevail for evaluation.

c. Similarly in the event of discrepancy between the words and figure, words shall prevail and adopted for evaluation.

d. To ascertain the substantial responsiveness of the bid OIL reserves the right to ask the bidder for clarification in respect of clauses covered under BRC also and such clarifications fulfilling the BRC clauses in toto must be received on or before the deadline given by the company, failing which the offer will be summarily rejected.

e. Priced bids of only those bidders will be opened whose offers are found technically acceptable. The technically acceptable bidders will be informed before opening of the "priced bid".

Annexure II-A

TENDER NO.SKI0407P14 Dated 04.07.2013.

UP-GRADATION & AUGEMENTATION OF PROCESS MONITORING SYSTEM FOR MAKUM OCS

(Instrumentation, Control & Data acquisition system)

CONTENTS

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SECTION A1

PROCESS MONITORING SYSTEM SH 1 OF 2

0.0 SCOPE OF ENQUIRY

0.1 This procurement specification covers design engineering, manufacture, testing at SUPPLIER'S works, packing, supply, transportation from place of manufacture to site, complete erection, and site testing after erection, startup, commissioning and performance testing of the Instrumentation, control & Data acquisition system.

0.2 The above Instrumentation, Control & Data Acquisition system package is required for Makum OCS to meet the additional requirement of process instruments against capacity augmentation of the OCS and also to **up-grade/replace** the existing control system with a new one. The term **up-grade** stands for upgrading the existing control system supplied by M/s Yogakawa, Model: Stardom with a suitable, latest and higher version of process controller from M/s Yogakawa, s current product line which is proven and established across the oil & gas sector operations worldwide. The term **replacement** stands for replacing the

existing control system supplied by M/s Yogakawa, Model: Stardom with a suitable latest control system configuration of any make where the presently connected I/O's in the existing system will be seamlessly hooked up with the new system in addition to the new I/O's that will be supplied as a part of this project. Bidder will also have to carry out the software configuration of existing open and closed process control loops that are in operation with the present control system. The scope will also include reconfiguration and redesign cum loop tuning of the existing closed loop PID control loops that are already running with the present control system. Preliminary list of all existing loops is attached with this tender and other details will be provided by us during detail engineering process.

0.3 The new process monitoring system shall be capable of monitoring and control of all process parameter including the existing and additional.

0.4 This procurement specification also covers integration of the existing field Instruments and existing control room instruments (if any) that were commissioned with Yokagawa, STAR DOM System. List of such control room equipments/systems will be provided by us during detail engineering stage.

0.5 This procurement specification also covers integration of the Instruments/Systems that are supplied by other suppliers (specified herein) in close liaison with them. Bidder will have to integrate the existing standalone systems with the offered system through MODBUS/Ethernet communication for alarm and process data sharing on a single platform.

The following two systems located in the control room needs to be integrated with the proposed system:

- **PLC based system of M/s Allen Bradley, Model: Flex-Logix, Catalogue no.1794-l34B**
- **M/s Emerson make Micro-motion 3700 series corillossis mass flow meter transmitter**.

Details about the two systems will be provided by us during detail engineering stage.

0.6 Bidder will also have to provide a **51inch LCD display panel** apart from the usual ES & OS and remote OS, which will be wall mounted in the control room for display of all process parameters, alarms, trends, graphics, plant overview in the form of P&ID, PFD etc. The alarms should be able to be acknowledged through soft interface as well as hard wired push-buttons mounted in the console/panel.

0.7 Bidder will have to dismantle, remove & isolate the existing control room marshalling panels, ES, OS, MIMIC panel and other associated components of the old system for installing the new system components to be supplied as a part of the up-grade project.

0.8 Bidder will have to employ process control specialists for converting the existing pneumatically controlled PID loops to electronic fully automatic closed loop PID control schemes including loop configuration and tuning as per the process control philosophy of the Oil Collecting station. Also the closed loop control scheme of the OCS must be fail safe type and under extreme case of system/power/servo/air failure the controllers must be configured to bring the process to a safe state. Bidder must consider in their bid any additional instruments/system that will be required to achieve the above control philosophy. P&ID, P&FD, Set-points, vessel operating condition and other process details will be provided by us as per bidder requirement during detail

engineering stage. All the closed loops controls will be tested under different process conditions for a period of minimum seven days after the configured system is handed over to OIL. Satisfactory Performance of these closed loops and complete testing of fail-safe control scheme will determine the final commissioning of the upgraded control system.

1.0 INSTRUCTIONS TO BIDDERS

1.1 BIDDERS (SUPPLIERS) are required to submit their offer under **"Two Bid System".** BIDDERS (SUPPLIERS) are required to submit the Technical bid and Price bid separately as per the instruction given in the forwarding letter / supplier guide documents . Technical bid shall contain strictly unpriced part of the Bid only. Price bids of the technically acceptable bidders shall only be opened in due course of time. Any offer not meeting this criterion shall be rejected out rightly.

1.2 The BIDDER (SUPPLIER) shall furnish along with the bid, the information called for in CHECK LIST (Section E2), Data sheets (Section D) and various schedules in section E in the prescribed format only, failing which the bid will be considered incomplete and OIL INDIA LIMITED (OIL) reserves the right to reject the bid.

1.3 The bid shall be in accordance with the specification and shall be complete in all respects. The bidder shall clearly indicate in his offer the list of deviations on a separate sheet (refer section E-3) even though these may be mentioned somewhere else in the quotation.

1.4 The BIDDER (SUPPLIER) shall clearly indicate in his bid that the prices quoted by them are firm.

1.5 All tools, tackles and equipments required for commissioning and carrying out tests should be arranged by the BIDDER (SUPPLIER).

1.6 BIDDER (SUPPLIER) is advised to **inspect** the site at their own cost and examine and obtain all information required and satisfy himself regarding all matters such as access to site, areas likely to be allotted to him for his storage yard and for his site works, transport and facilities required for the satisfactory completion of work and also the **detail instrument/system requirements to complete the up-gradation cum augmentation job including instrument hook-up options/schemes/provisions available etc as per the scope of the tender**. Ignorance of site conditions shall not be accepted as basis for any claim for compensation. The submission of Tender by BIDDER (SUPPLIER) will be construed as evidence that such an examination was made and any later claims/ disputes in regard to price quoted shall not be entertained by OIL INDIA LIMITED (OIL).

1.7 BIDDER (SUPPLIER) shall furnish along with his bid the list of manufactured items, along with the manufacturer's name that are proposed to be used in this contract. The BIDDER(SUPPLIER) shall provide detailed technical literature of each equipment to be supplied along with the BID without which the offer is likely to be rejected.

1.8 Within TWO (2) weeks from the date of receipt of Letter of Intent the successful BIDDER (SUPPLIER) shall submit the first set of drawings for the approval of OIL INDIA LIMITED (OIL). The drawings will normally be commented upon approved and dispatched within TWO (2) weeks of their receipt by OIL INDIA LIMITED (OIL). No claim, however, shall be entertained due to any delay in the approval of the BIDDER (SUPPLIER)'S drawings.

1.9 The BIDDER (SUPPLIER) shall separately indicate prices for recommended spare parts (for 2 years of operation) and Service contract offer as called for in section E-5.

1.10 The BIDDER shall be confirm that all the spare part of their offered system will be available for at least ten(10) years from date of supply.

1.11 As a part of scope of services, the successful BIDDER (SUPPLIER) shall impart comprehensive training to OIL INDIA LIMITED (OIL) personnel covering the salient features as required for proper operation and maintenance of the complete system.

2.0 DELIVERY

The SUPPLIER shall complete design, manufacture and supply of the PROCESS MONITORING SYSTEM as specified complete with all accessories within 16 weeks from the date of issue of Letter of Intent (LOI) or placement of order, whichever is earlier. The erection, testing and commissioning of the system at site shall be completed within 8 weeks time.

3.0 LIQUIDATED DAMAGES

3.1 Delivery period shall be guaranteed. In case of delays, the SUPPLIER shall be liable to pay by the way of liquidated damages of 0.5% of the value of the order for each weeks (or part there of) delay beyond the agreed date(s) mentioned in Purchase Order, subject to a maximum of 7.5% of order value.

4.0 PERFORMANCE BANK GUARANTEE

4.1 Successful bidder shall be required to furnish a **Performance Bank Guarantee @10% of the cost of the materials.** The Performance Bank Guarantee must be valid for one year from the date of successful commissioning of the equipment to cover the entire warranty period. Offers not complying with this clause shall be rejected.

1.0 PROJECT INFORMATION – GENERAL

1.1 Owner/ Purchaser : OIL INDIA LIMITED

1.2 Project Title: Up-gradation & Augmentation of PROCESS MONITORING SYSTEM for MAKUM OIL COLLECTING STATION

1.3 location : Makum, Assam

1.4 Nearest Railway station : Tinsukia, Assam

1.5 Name of the Railway : North Frontier Railway

1.6 Nearest Highway : NH 37

1.7 Distance of nearest Highway from site : 3 Kms

1.8 Altitude above mean Sea level : 300 feet

1.9 Ambient air temperature

a) Maximum : 40.0 Deg. C
b) Minimum : 5.0 Deg. C
c) Average : 26.5 Deg. C
a) Reference Temperature For design of electronic Equipment/ Devices : 40.0 Deg. C

1.10 Relative Humidity %

a) Maximum during monsoon : 100% at 21 Deg. C
b) Minimum : 70% at 41 Deg. C
c) Average : 95% at 32 Deg. C

1.11 Rainfall

a) Maximum : 480 mm (in July)
b) Minimum : 27 mm (in November)

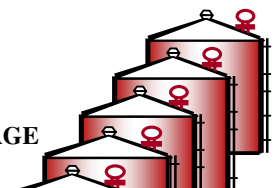
It rains throughout the year.

1.12 Wind Velocity

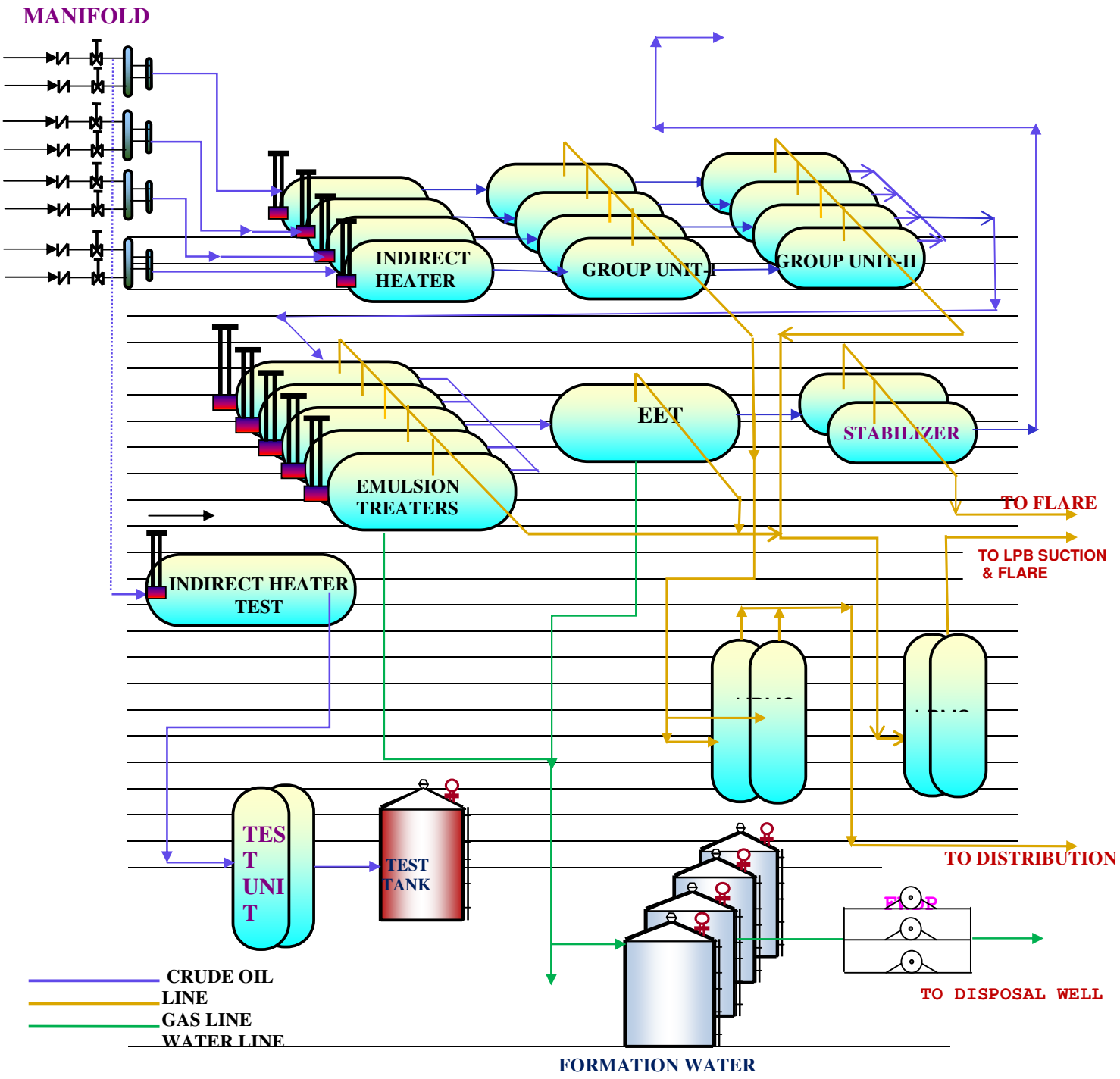
a) Basic Wind speed : 20 Km/hr
b) Prevailing wind Conditions (direction) : From east

1.13 Environment : Humid

1.0 PROJECT INFORMATION – PROCESS DETAILS:



1.1 MAKUM OCS FLOW SCHEMATIC



1.2 PROCESS OF OIL COLLECTING STATION

The process in an OIL COLLECTING STATION comprises of a system for gathering produced fluid from a number of oil wells and separation of the Crude oil, Natural Gas, Water and other solid particles such as reservoir sands from the well fluid.

In order to achieve this, the well fluid is passed through a network of heaters, various pressure vessels (separators) and there by knocking out the undesired water and stripping the gas from the crude oil. The pressure staging of the vessels is so maintained with backpressure controllers that an optimum separation of the oil and gas is achieved and separated gas is utilized for end users. The separated crude is stored in fixed roof storage tanks and from there pumped to the main trunk pipeline.

1.3 PROCESS VESSEL DETAILS

a) HP MANIFOLD:
(M-101,M-101A,M-101B,M-101C)

Max. pressure of the Flow line	:	75 kg/Cm^2
Max. operating pressure	:	25 Kg/Cm^2
Normal operating pressure	:	21 Kg/Cm^2
Operating temperature range	:	10 – 50^0C

NOTE: MAXIMUM INDIVIUAL WELL PRESSURE CONNECTED TO HP MANIFOLD:210 Kg/Cm^2

b) LP MANIFOLD:
(M-102,M-102A,M-102B)

Max. operating pressure	:	10 Kg/Cm^2
Normal operating pressure	:	6 Kg/Cm^2
Operating temperature range	:	10 – 50^0C

NOTE: MAXIMUM INDIVIUAL WELL PRESSURE CONNECTED TO LP MANIFOLD: 210 Kg/Cm^2

c) GROUP UNIT-I :
(V-101/GU-1, V-102/GU-2,V-117/GU-3,V-118/GU-4)

Vessel	:	Horizontal, Pressurized
Operating Pressure	:	25 Kg/Cm^2
Max. Pressure	:	37.5 Kg/Cm^2
Capacity	:	5000 BPD (oil)
Dimensions	:	Length(side to Side):4.57M
		Dia.: 1.093 Mtr (height)

d) GROUP UNIT-II
(V-103/GU-5, V-104/GU-6,V-119/GU-7,V-120/GU-8)

Vessel	:	Horizontal, Pressurized
Operating Pressure	:	7.0 Kg/Cm^2

Max. Pressure : 12.8 Kg/Cm^2
Capacity : 5000 BPD (oil)
Dimensions : L(S/S): 4.30M, Dia.: 1.40M

e) EMULSION TREATERS
(V-105/ET-1, V-106/ET-2,V-121/ET-3,V-122/ET-4)

Vessel : Horizontal, Pressurized With Gas fired Heater
Operating Pressure : 3.5 Kg/Cm^2
Max. Pressure : 5.0 Kg/Cm^2
Capacity : 5000 BPD (oil)
Operating Temp. range : 60 – 70^{0}C
Burner details : 2-Natural gas fired burners of 1,000,000 BTU/Hr capacities each
Dimensions : L (s/s): 9.25M, Dia.: 2.0M (Height) Body plate thickness: 8 mm

f) STABILIZERS
(V-107/STB-1, V-108/STB-2)

Vessel : Horizontal, Pressurized
Operating Pressure : 1 Kg/Cm^2
Max. Pressure : 5.25 Kg/Cm^2
Capacity : 10,000 BPD (oil)
Dimensions : L(S/S):4.60M, Dia.:1.5M (height)

g) TEST UNIT-I
(V-109/TU-I)

Vessel : Vertical, Pressurized
Operating Pressure : 21 Kg/Cm^2
Max. Pressure : 31.5 Kg/Cm^2
Operating Temperature range : 10 – 50^{0}C
Capacity : 3000 BPD (oil)
Dimensions : Height: 4.0M, Dia.: 1.0M
Gas outlet line size : 4" NB

h) TEST UNIT-II
(V-110/TU-II)

Vessel : Vertical, Pressurized
Operating Pressure : 2.0 Kg/Cm^2
Max. Pressure : 10 Kg/Cm^2
Operating Temperature range : 10 – 50^{2}C
Capacity : 3000 BPD (oil)
Dimensions : Height: 3.05M Dia.: 1.085M
Gas outlet line size : 6" NB

i) HIGH PRESSURE MASTER SEPERATOR (HPMS)
(V-111/HPMS-1, V-112/HPMS-2)

Vessel : Vertical, Pressurized

Operating Pressure	:	25 Kg/Cm^2
Max. Pressure	:	37.5 Kg/Cm^2
Capacity	:	15 MMSCFD (Gas), 500 BPD (oil)
Dimensions	:	Height: 3.05M, Dia.: 1.07M

j) LOW PRESSURE MASTER SEPERATOR (LPMS)
(V-113/LPMS-I, V-114/LPMS-II, V-115/VLPMS)

Vessel	:	Vertical, Pressurized
Operating Pressure	:	2.0 Kg/Cm^2
Max. Pressure	:	6.5 Kg/Cm^2
Operating Temp. range	:	10 – 50^{0}C
Gas flow range	:	0.4 MMSCMD
Gas outlet line size	:	10" NB
Capacity	:	0.4 MMSCMD (GAS)
Dimensions	:	Height: 2.35M, Dia.: 1.20M

k) SERVO TANK
(V-116/ST-1)

Vessel	:	Vertical, Pressurized
Operating Pressure	:	10 Kg/Cm^2
Max. Pressure	:	15 Kg/Cm^2
Outlet Gas flow range (Internal gas consumption of OCS)	:	

l) CRUDE OIL DESPATCH MANIFOLD
(X-101)

Operating Pressure	:	35 Kg/Cm^2
Max. Pressure	:	70 Kg/Cm^2
Outlet Crude oil flow range	:	140 M^3/Hr
Water percentage range of Crude oil	:	less than 0.5%

m) CRUDE OIL STORAGE TANK
(T-101, T-102,T-103,T-104,T-105,T-106)

Capacity	:	795KL
Dimensions	:	Height: 10.0M Dia.: 10.67M
Operating Pressure	:	Atmospheric

n) TEST TANK
(T-103/T-107)

Capacity	:	1000 BBL (US)
Dimensions	:	Height: 4.87M, Dia.: 6.55M
Operating Pressure	:	Atmospheric

o) CRUDE OIL DESPATCH PUMPS
(P-104, P-105, P-106, P-107,P-108)

Capacity of each pump	:	60 KL/HOUR

Operating Pressure	:	35 Kg/Cm^2
Maximum Pressure	:	70 Kg/Cm^2
Prime mover	:	Gas Engine

p) FORMATION WATER DISPOSAL PUMPS
(P-201, P-202, P-203)

Prime mover	:	Electric Motor

q) SUMP WATER PUMPS
(P-301, P-302)

prime mover	:	Electric Motor

1.12 EXISTING PROCESS MONITORING SYSTEM:

The existing PMS system is STAR DOM System supplied by M/s-Yokogawa India Limited, Plot No:96 Electronic City Complex, Hosur Road, Bangalore-560 100, India.

The configuration of EXISTING stardom system is as follows:

- Engineering station hosts the logic designer software and used to programme the process logics using slandered IEC61131-3 programming, support with color printer.
- Operator station hosting Versatile Data Server (VDS) software acts as both HMI &client. Operator station acts as an interface with the whole plant, helps monitoring the process parameters, displaying the plant graphics support with dot matrix printer.
- A dual redundant FCN is configured with extended I/O racks& various I/O modules located in the control cabinet. I/O is non redundant.
- Ethernet is the backbone of the whole communication net work with engineering station, operator station & FCN.

1.12.1 The system Configuration:(Sketch enclosed)

1.12.2 The List of Existing Field Instrument:

Sl No.	Item	Qnty.	Remarks
1	Pressure Transmitter(PT)	16	Supplier has to connect with new system supplied by them
2	Diaphragm Seal Pressure Transmitter	23	-do-
3	Temp. Transmitter with RTD (TT)	11	-do-
4	Differential Pressure Transmitter (DPT))	9	-do-
5	RADAR Tank Level Gauge	5	-do-
6	Guided Wave RADAR Level Transmitter(LT)	10	-do-
7	Guided Wave Inter-phase Level Transmitter(ILT)	2	-do-
8	Water in Oil Monitor	1	-do-
9	Pressure Switch with Diaphragm Seal(flow switch)	7	-do-
10	Current to Pneumatic (I/P) Converter	18	-do-
11	Pilot Flame monitor with Thermocouple	7	-do-

1.12.3 The List of Existing I/O's:

Digital Input (DI): 27
Digital Output (DO): 56 for MIMIC DISPLAY
Analogue Input (AI): 75
Analogue Input for control (AIC): 20

Analogue Output for control (AOC): 20

1.12.4 The list of Existing control room equipments.

SlNo.	Item	Qnty	Remarks
1	Engineering Station	1	Supplier has to replace.
2	Operator Station	1	Supplier has to replace.
3	Redundent CPU	1+1	As per requirement
4	Laser Printer (B/W)	1	Supplier has to replace
5	Control Cabinet	2	Supplier has to replace
6	DC Regulated Power Supply, 24 VDC		Supplier has to replace
7	Dual UPS, 5 KVA with 12 Hour Battery Backup with lightning protection	One 5KVA UPS is in Damaged condition	Supplier has to replace
8	Hardwired Mimic panel	1	Supplier has to replace with LCD panel

1.13 PROPOSED PROCESS MONITORING & Control SYSTEM

The proposed process monitoring & control system will monitor all the important parameters like Pressure, Level, Flow, Water percentage etc., of the OIL COLLECTING STATION (OCS) from the Control room and alert the operator for any abnormal process conditions with audio & visual alarms. It will also control the process for the parameters mentioned in the tender.

SECTION B2

PROCESS MONITORING SYSTEM SH 8 OF 8

1.5 P&I DIAGRAM

The existing P&I Diagram of MAKUM OCS where new equipments are not shown are enclosed as SKETCH-I **(SK.NO.INST/071)**. Pneumatic controllers are used at present for controlling those closed loops which we plan to convert to electronic PID control through the subject tender. The present Instrumentation under PROCESS MONITORING SYSTEM is shown in DOTTED LINES. The proposed Instrumentation under the scope of this tender for

each additional/existing OCS equipment is shown separately with the new instrument tag numbers.

1.6 THE LAYOUT DIAGRAM

The layout Diagram of MAKUM OCS indicating the layout of major process equipments is enclosed as SKETCH-II

1.7 CONTROL ROOM

The existing CONTROL ROOM plan with existing control room equipments/systems of M/s YBL is enclosed as SKETCH-III. The CONTROL ROOM is indicated as PROCESS MONITORING CUM OPERATOR'S ROOM in the SKETCH.

1.0 SYSTEM TO BE FURNISHED

1.1 This specification is for design engineering, manufacturing, 100% integrated testing at SUPPLIER'S works, supply, packing, forwarding, delivery at site, erection, commissioning, carrying out performance/ acceptance tests at site of the complete system as specified in scope of supply in Para 2.0 below.

1.2 The plant shall be largely controlled from Central control room of size given in the enclosed **SKETCH-III**. All the electronic cubicles and the operator control center shall be located in control room, which shall be air-conditioned. Supply of Air-conditioners is not in bidder's scope.

2.0 SCOPE OF SUPPLY

2.1	Microprocessor based Control system(dual redundant)	Qty.
2.1.1	Supervisor station with 21"TFT & Key board (Engineer's console)	1
2.1.2	Operator station with 21"TFT & Key board (Operator's console)- **Local OS & Remote OS**	2
2.1.3	Communication link (Cable)	As required
2.1.4	Dual redundant Microprocessor based controller With Power supply module and communi -cation module	As required
2.1.5	Input Modules (Analog and Digital) (As per Clause Nos 16.0 & 17.0 of Section C)- **for existing + new**	As required
2.1.6	Output Modules (Analog and Digital) (As per Clause Nos 18.0 & 19.0 of Section C))- **for existing + new**	As required
2.1.7	Data acquisition system	As required
2.2	Field Instruments (As per details provided in Section D4 to D14)	As mentioned here in
2.3	51" LCD/Plasma Display	1 No.
2.4	Printers (Inkjet Colour Printer -1 Inkjet B&W Printer-1)	2 Nos

***** Note: In case of LCD display panel the requirement of digital output cards will be eliminated as the panel can communicate with the processor/server via Ethernet/serial communication media.**

2.5	5KVA Dual redundant UPS(Uninterrupted Power supply) with 12-hours battery Back-up.	1 Set(2 Nos)
2.6	DC power supply for field Instruments with Diode"O"ring	2 No in redundant mode
2.7	Zener Barriers	As required
2.8	Laptop computer (programming device)	1 No

2.9	Erection Work	
2.9.1	Instruments to be supplied by SUPPLIER	
2.9.2	Integration of the existing Instruments with new system supplied by SUPPLIER – as per existing I/O list.	
2.10	Supply of Erection Hardware like Globe/ Needle valves, Impulse tube/ elbows, union, tee, 2" stand pipes etc.(As per the Installation sketches 1, 2, 3 & 4 enclosed)	As required
2.11	Termination Cabinet	As required
2.12	Control system cabinet to mount controller, I/O, Power supply modules etc.	As required
2.13	Prefabricated cable to connect Cabinets, ES, OS, TFT, LCD/Plasma display	As required
2.14	Control cable to connect field Instruments to Termination Cabinet And Termination cabinet to Field Control devices (As per the details provided in Section D15)	As required
2.15	Cable trays (As per details provided in Section D16)	As required

3.0 TECHNICAL REQUIREMENTS

3.1 Microprocessor based Control system

3.1.1 **General**

Microprocessor based control system shall achieve the functions of signal acquisition, signal conditioning, indication, closed loop control, open loop control, alarm processing and annunciation, calculation, data logging, trending, graphic display of process, issue of management reports & self monitoring of system failures.

3.1.2 Hardware requirements

The Hardware shall consist of a minimum possible number of different modules. Preferably the programs and fixed data shall be stored in EPROM. If this is not available, all RAM's within the digital control system have to be backed up by battery, so that in case of power failure no program reloading shall be necessary. **The system must have a minimum spare capacity of at least 30% (measuring circuits, control loops etc.)for future use of OIL.**

3.1.3 Performance requirements

The system shall be designed and manufactured to meet the following performance requirements.

- Numerical outputs shall be reproducible to 0.1% of a known analog input at mid scale reading
- Resolution of minimum 10 bits plus sign bit
- Calculations, square root extractions and other computations shall be accurate to +1 to –1 (last digit)
- Linearity shall be within 0.2% of all inputs
- For analog inputs, input impedance shall be less than 10 ohms for current inputs and greater than 1 Mega Ohm for Voltage inputs. Any input shall withstand a steady signal of 24V or 10 times normal input which ever is greater. Each input shall be fused against any greater overload. Overload of any channel shall not affect any other channel. Channel to channel isolation shall exceed 10 mega ohms.
- Channel selection shall be programmable

3.1.4 PROCESSOR

In case of CPU complete backup with automatic changeover has to be provided to take over control automatically in the event of failure of operating Processor.

3.1.5 Signal input and output processing

In order to ensure a high availability, the Hardware shall be functionally distributed, i.e., a limited number of inputs and outputs per module so that any failure shall have limited effect. The analog signal input cards shall be able to accept mA signals and voltage signals from the

field transmitters of SMART & 2-wire type. Conversion in to engineering units by calibration and linearization of the signals shall be possible. For long time stability of calibration, automatic periodical test measurement and recalibration for zero and full range shall be incorporated.
Filters to eliminate ripples and disturbances normally expected in the field shall be provided.

The Digital input cards shall be able to supervise the circuit integrity and the antivalence of Digital signal contacts and they shall ensure that the current through the closed contacts shall be at least 3 ma, and the voltage at the open contacts shall be potentially free.

The outputs of analog and digital output cards shall be short circuit proof.

All the field Transmitters/ sensors/ switches/ I/P converters shall be connected to the Control system through suitable ZENER BARRIERS of MTL/P&F make.

3.1.6 CLOSED LOOP CONTROL

Besides the modulating control function PID, the controllers shall contain facilities for bump less balance less transfer, auto/manual switching, cascading, feed forward control etc.

The controller should cycle through its algorithms and self-diagnostic routines in less than 1 second.

3.1.7 OPEN LOOP CONTROL

Open loop control contains sequential control and alarm functions such as logic, IF-THEN, AND-OR, Time delay, Over/Under limit monitoring, Manual remote operation etc.

3.1.8 GAS FLOW CALCULATION

Gas flow calculations shall be carried out using AGA-3 (American Gas Association report No:3) and NX-19 standards using DP (Differential Pressure), P (Pressure), T (Temperature) and Orifice plate diameter as variables.

Bidder will have to have these software's loaded in their processing system for carrying out AGA-3 calculations using our existing DP based flow transmitters. All the existing flow loops connected to the present control system are to be seamlessly integrated with the new control system and have to execute the AGA-3 flow calculations.

3.1.9 OPERATION STATIONS (ENGINEER AND OPERATOR & REMOTE OS)

Operation stations with TFT and functional Keyboards shall be provided for man-machine interface in the control room. It shall be possible to display mechanical flow diagrams, group displays, alarm lists with dynamically updated process parameters on the screen.

Each station shall consist of the following peripherals.

- 1 no 21 inch high resolution color TFT monitor.
- 1 no black & white laser jet printer (For OPERATOR STATION only)
- 1 no Colour laser-jet Printer (For ENGINEER STATION only)
- P-IV/better 1GHz or better CPU with 512 KB cache, 2 GB RAM or better, 160 GB IDE HDD, 1024X768 pixel, 65K colour resolution supported VGA.
- 52X (or above) CD ROM shall be provided
- 32 bit ethernet card/better
- 2 Serial ports, 2 Parallel ports & 4 USB port

Through this operating console it shall be possible to, control the various valves, monitor the status of the entire plant through graphic displays, alarms, trends, printed reports, logs etc. In addition, it shall also be possible to view all loop variables, configure control system, create graphic display format, tune controllers and change set points.

System configuration can only be modified through Engineer's station. System shall have Historic storage facility of all plant parameters for a period of 30 days. The system shall have facility to take backup of the Historical data.

Main memory shall be of non-volatile type, protected against loss or corruption in case of power failure. BIDDER shall state in his proposal the size of memory both used and installed. BIDDER shall be responsible for providing the main memory of adequate size including 30% spare capacity.

Main memory shall be provided by fixed head disk. CD's may be used only to load and to extract programs or data. Main memory storage devices shall be protected against

damage or corruption resulting from loss of power. Each kind of transferred data shall be checked (e.g., Parity or CRC checks).

The keyboards shall be of the dedicated design with function keys to suit the system, and shall be of proven quality. Keyboard operation must be conceived in such a manner that the selection of the different displays and

access to the process variables shall be possible from a dedicated functional keyboard very quickly, with only a few keystrokes.

The control functions shall be possible to be implemented by the use of simple, user-friendly application language. Control functions shall be programmable from ladder or interlocking diagrams or similar. For the generation of new process graphic displays, a standard library of symbols shall be used.

3.1.10 SYSTEM DIAGNOSTICS AND CONFIGURATION

For configuration and modification of the control logics no computer programming knowledge must be necessary. All Configuration of the control function should be possible by simply selecting a programmed algorithm and entering the required attribute information such as input and output location and tuning constants. Control loop and sequential logic should be built by linking the desired control function as they appear on control and sequential diagram. At least 30% spare capacity should be provided in initial installation to achieve ease of modification.

All these functions shall be available only at the engineering console. Operation of the Engineering console by unauthorized personnel shall be prevented by the use of key lock or code words.

The system shall monitor itself continuously for failure by self-diagnostics. Diagnostic routines shall be applied to each control module. Detailed diagnostic messages shall be displayed on the screen and printer.

3.1.11 UPS(UNINTERRUPTED POWER SUPPLY)

5KVA dual redundant on-line UPS with 12-HOURS backup time shall be provided. The backup batteries shall be of sealed maintenance free type. The SUPPLIER has to provide the load calculation sheet in selecting the capacity of the UPS to OIL, if load is more than 5KVA.

3.1.12 DC POWER SUPPLY FOR FIELD INSTRUMENTS

Dual redundant 24V DC power supply with diode “o” rings of suitable capacity to power all the field instruments shall be provided. The SUPPLIER has to provide the load calculation sheet in selecting the capacity of the DC Power supply.

3.1.14 SPARE CAPACITY AFTER COMPLETION OF COMMISSIONING

At least **30%** free space shall be available in each cabinet after final commissioning. This free space shall be distributed over the cabinet in such a way that additional equipment or modules may be added to any group of controls.

4.0 SYSTEM CONFIGURATION

System configuration is indicated in section C, sheet 10.

4.1 Termination cabinet, Control system cabinet, Operator station TFT, Engineer station TFT,51inch wall mounted LCD panel, B&W Printer, Color Printer LCD display and UPS shall be located in Control Room.

4.2 All signals from field Transmitters/ Sensors and signals to Field control devices shall be terminated in the Termination Cabinet.

4.3 All Input/ Output modules, Loop controllers and logic controlled communication modules, Power supply module shall be located in the control system cabinet.

4.4 Black & white laser jet printer shall be connected to Operator station and Color laser-jet Printer shall be connected to Engineer station.

4.5 Operator Station and Engineer station shall be connected to communication processor module through gateway. Also provision shall be made for all plant data transfer from gateway to remote station at DULIAJAN at a distance of 50 Kms from site via existing OIL's SCADA/ERP/LAN communication network.

4.6 LCD/Plasma (51") display shall be connected with the Gateway to display all mimic & alarm of Control system.

5.0 SOFTWARE:

5.1 OPERATING SYSTEM SOFTWARE

The Operating system must be real time, modular in design and shall provide effective utilization of resources and facilitate future expansion. It shall have the following features.

Real time capabilities

Multiprogramming and Multitasking facility including background and foreground operations in real time mode.

Virtual memory system

Event based priority scheduling

Dynamic memory allocation

System security features

Real time programming and processing

Line and page editors, Library management

Dual Ethernet LAN support

Bulk storage management

Input/Output drivers for all peripherals

Graphic support package

Online and detailed offline diagnostic package to trouble shoot CPU, memory and various system and peripheral cards.

Utility programs need to be provided such as editors, compilers, linker and extensive debugger.

The Control system shall be built around real time data base management system which handles both the data storage and interprocess communication.

Industrial standard high performance graphic user interface and programming interface

Networking software shall also be provided and each processing unit shall run it's own copy of operating system and shall be able to operate as connected node and stand alone node.

Anti-virus vaccine/ Detection utility

5.1 CONTROL SYSTEM SOFTWARE

The Control system software which is field proven in control and data acquisition application using DCS compatible devices in oil & gas processing systems shall be supplied with the processing units.

As a minimum requirement, it shall have the following packages.

- System and database configuration
- Generation of current raw and processed data base.
- Generation of historical data for Trending and archival

- Alarm handling, including storage, display and print out.
- Generation, storage, presentation of mimic diagrams with dynamic information presented on TFTs.
- Display management for Alarm, Alerts, Mimic diagrams, Analog and Digital values, Trend graphs, Bar charts in semi graphic and high resolution colour graphic modes.

- Free format report generation, storage and print out.

- Data logging at periodic intervals, on operator request and automatically on occurrence of an event.

- Transmission of control commands and configuration parameters to Outstations defined in system with fast update of related information on MMI.

- DCS/PLC engineering tools, DCS/PLC device management tools and support tools

- ERP (SAP based) compatible

5.2 APPLICATION SOFTWARE

Gas flow calculation software as per American Gas association Reports – AGA3 and AGA-8 shall be implemented in the system.

The latest versions of the AGA3 and AGA8 shall be implemented.

5.3 SOFTWARE LICENCE

Licensed software shall be provided as per the system requirement.

One additional set of licensed software consisting of Operating system, Control system software and application software shall be provided to OIL.

The Bidder has to consider the additional license while quoting.

6 OPERATOR / ENGINEER station DISPLAYS & DAS FUNCTIONS

6.1 Functional equivalent of an Annunciation.

6.2 Over-view functional equivalent of a complement of selector switches digitized status indication shall also be included.

6.3 Loops – Functional equivalent of a set of stand alone PID loop controller faceplates indicating current value of Process variable, set point etc.

Note: The above displays are indicative. VENDOR can also include displays, which he feels necessary for the operation of the system.

6.4 The following Logs, Reports and Mimics shall be provided.

6.4.1 SIGNAL LOG

System shall record correct timely the alarm signals displayed or received by fault alarm system.

6.4.2 TREND LOG

Provision shall be made for on-demand time dependent monitoring of the function "Recorder" for different process parameters and they shall be printed at the particular scanning frequency.

6.4.3 REPORTS

System shall provide

- Plant status report of all process parameters recorded half hourly (to be generated at every 4 hours)
- 12 hours Production report
- 24 hours Production report

Any other reports as per OIL requirement shall be provided. All the report formats shall be made in consultation with OIL.

6.4.4 MIMIC DISPLAYS

The following Mimic displays shall be provided in the operation consoles. Any other Mimic as per site requirement will have to be provided by the supplier. All the Mimics shall be prepared in consultation with OIL Engineers.

SL.NO	DESCRIPTION
1	MANIFOLDS
2	INDIRECT HEATERS
3	GROUP UNITS
4	THREE PHASE SEPARATORS
5	EMULSION TREATERS
6	STABILIZERS

7	TEST UNITS
8	HIGH PRESSURE MASTER SEPARATORS
9	LOW PRESSURE MASTER SEPARATORS
10	SERVO/ FUEL GAS SCRUBBER
11	CRUDE OIL STORAGE TANKS
12	CRUDE OIL DESPATCH PUMPS
13	UTILITIES
14	SYSTEM CONFIGURATION DIAGRAM

7.0 SPECIFIC I & C REQUIREMENT

7.1 POWER SUPPLY

A Dual redundant UPS (Un-interrupted power supply) shall provide power supply to the control system. A changeover panel shall be provided for automatic switching of the UPSs from stand-by to online mode.

Generators shall provide 230V AC supply to the UPS units. The UPSs shall be equipped with safety and protective circuits to deal with wide variations in voltage (160V AC to 270V AC) and Frequency (45 Hz to 55 Hz) of the input AC supply from the Generators

The Power supply system shall be designed in such a way that the Battery bank shall provide a minimum 12 hours backup time in case of failure of the Generator supply. The batteries shall be of sealed maintenance free type. The supplier shall provide the UPS sizing details in the offer.

7.2 ZENER BARRIERS: All the field Transmitters/ sensors/ switches/ I/P converters shall be connected to the Control system through suitable ZENER BARRIERS of MTL/P&F make.

7.3 DGMS approval for the entire Field mounted Instruments in Oil collecting station is mandatory.

The BIDDER has to ensure that all the field instruments offered shall be certified by CIMFR (Central Institute for Mining and fuel Research Institute) or ERTL (Electronic Regional Testing laboratory) or other Government recognized testing laboratories (as approved by DGMS) and duly approved by DGMS (Director General of Mines Safety), Dhanbad for use in Oil Collecting Station [Hazardous area classification: Zone 1, Zone 2, Gas group IIA & IIB (Division 1, Division 2, Gas group Class I, Group C&D)] environment.

If the Bidder is not in a position to provide the final approval letter from DGMS at the time of commissioning, the minimum requirement for allowing commissioning shall be FIELD TRIAL PERMISSION letter from DGMS.

Till the submission of DGMS approval letter, full payment towards installation and commissioning shall not be released – Please refer payment terms of the tender.

7.4 CABINETS:

CABINETS: Painting of the cabinets both outside & inside shall be as per colour code RAL 7032 (Siemens gray)

7.5 The control system must accept all signals generated by the instruments that are in SUPPLIER'S and OTHERS scope of supply and the control system must give outputs to drive the final control elements supplied by others.

7.6 230V AC single phase, 50 Hz power supply will be provided to the SUPPLIER for control power supply. The SUPPLIER should specify the total power requirement of the system with breakup.

7.7 Control system cabinet and Termination cabinet to be supplied by the SUPPLIER shall be complete with compression type brass cable glands for termination of cables. Control cabinet and Termination cabinet shall be provided with removable type cable gland plates at the bottom.

7.8 Wherever electrical interconnection by means of cable is required between TWO equipments/ devices supplied under this contract, the SUPPLIER shall supply interconnection schedule.

7.9 Static and dynamic testing of the Control system in shop shall be done in the presence of OIL'S representatives. SUPPLIER shall submit the test procedures.

7.10 In the Control room, all cables shall be laid under the floor. Proper shielding shall be provided to protect the cable against rodent biting and ingress of water. Suitable covers shall be provided on the cable tray.

7.11 In the field area all cables shall be laid in underground cable trenches except for hard standing process area where the cables shall be laid through cable trays.

7.12 CABLE LAYING IN THE TRENCH:
The size of the cable trench shall be 45cm wide and 75cm/90cm deep. 75mm thick sand bed shall be provided at the bottom. After laying the cable another 75mm thick sand bed shall be provided on the top. Bricks shall be provided over the top sand bed and trench shall be filled back with earth. Cable markers shall be provided at suitable distances.

7.13 LAYING OF CABLE TRAYS: Cable trays in the Hard standing process area shall be fixed over angle posts grouted uniformly over the ground. Cable trays shall be laid in vertical position so that rainwater does not accumulate in the tray. The size of the G.I angle post shall be 38mm X 38mm X 1067mm approximately. The angle post shall be grouted to 457mm (approx.) inside the ground. GI nuts and bolts shall be used for fixing the tray with angle posts. Aluminium strips of 25mm size (approx.) with 3mm minimum thickness with GI nuts and bolts shall be used for fixing the cable in the Cable tray.

7.14 SUPPLIER shall provide proper earthing system for the complete I & C system. This earthing system should be separate from plant earthing system.

8.0 ERECTION, TESTING AND COMMISSIONING

8.1 The successful bidder shall carryout complete erection of all supplied instruments.

8.2 The successful bidder shall carryout the performance test of equipment at site to demonstrate guaranteed performance parameters.

8.3 The SUPPLIER has to provide the proposed installation diagrams of control system and different instruments with in 2 weeks time of receipt of LOI for OIL's approval

8.4 Civil works for erecting the 2 inch standpipes & cable trays shall be done by the Bidder.

8.5 All tools, tackles and equipments required for commissioning and carrying out tests should be arranged by the successful bidder.

8.6 Bidders are required to quote for Installation and Commissioning Charges keeping in view the above.

9.0 APPLICABLE CODES AND STANDARDS

The following standards shall be followed for the I & C system.

ANSI – American National Standards Institute
DIN – Deutsche Industry Norm "German Industry Standards"

NFPA 70, 85C – National Fire Protection Agency

NEC – National Electric Code

IEC 529 – Classification of degrees of protection provided

IEC 79 – Electrical apparatus for explosive Gas atmospheres

NEMA ICS.6 – Enclosures for Industrial controls and systems

OISD-152 – Oil Industry Safety Directorate standard for safety Instrumentation

OMR-1983 – Oil Mines Regulations act

Weights & Measures approvals

10.0 EXCLUSIONS

The following supply, works and services are excluded from the SUPPLIER'S scope.

10.1 Supply and installation of existing field instruments, cable, Flame Proof Junction Boxes, cable tray.

10.2 Necessary piping modification, supply and installation of isolation valves, installation of counter flange for installation of Water-in-oil-Monitor at Crude oil despatch pump outlet.

10.3 Installation of the counter flanges for Level Transmitters

10.4 Supply and installation of Control valves and Air filter Regulators & Orifice plates.

11.0 TERMINAL POINTS

11.1 Instruments, Operating console indications, Closed loop controls, Open loop controls/interlocks as specified.

11.2 For the following instruments, the terminal points shall be shown in respective erection sketches.

11.3 Gauge Pressure Transmitter

11.4 Gauge Pressure Transmitter with remote seal

11.5 Differential Pressure Transmitter

12.0 TRAINING:

12.1 The SUPPLIER shall provide a comprehensive training for a minimum of 6 (SIX) OIL's Engineers on the operation and maintenance of the Control and Data acquisition system at their works.

12.2 The training module must be divided into two parts one module for operators where two operators will be trained and the one module for maintenance of the system where four(4) instrumentation engineers will be trained.

12.3 The SUPPLIER shall also provide routine operation training to OIL operators after the installation and commissioning of the system at site.

12.4 The training shall be so oriented as to make the OIL personnel proficient in operation and maintenance of the equipment.

12.5 The charges for training the OIL personnel shall be included and clearly indicated in the price for supply of erection, testing and commissioning.

13 DOCUMENTATION

13.1 The SUPPLIER shall provide 3 (THREE) sets each of the following documentation:

a) Operation and maintenance manual of each field Instrument

b) Instrument list and Instrument data sheets

b) ITP & Calibration reports

c) As built drawings

d) Cable schedule

e) Hook up drawings

f) Detailed operation and maintenance manual of the Data acquisition and Control system

13.2 The operation and maintenance manuals together with drawings shall be in sufficient detail to enable the Oil personnel to maintain, dismantle, reassemble and calibrate the equipments.

13.3 SOFTWARE BACKUP:

The SUPPLIER shall provide 2(TWO) copies SOFTWARE BACKUP each for Operator station and Engineer station after completion of the User software development and commissioning of the plant. It shall include the Operating system backup also.

13.4 The SUPPLIER shall provide all the PASSWORDS after commissioning of the system to OIL.

13.5 **DGMS Certification**:

The SUPPLIER has to obtain the necessary DGMS (Director General of Mines Safety), Dhanbad certification for the entire field Instruments to be used in the Oil Collecting station and to be submitted to OIL before commissioning of the system.

Electrical/ electronic equipment shall be CIMFR (OR equivalent) certified and DGMS approved. The CIMFR certificate No. and DGMS approval No. shall be affixed or embossed on each piece of equipment.

In case DGMS approved electrical/electronics equipment is not available, the same shall be supplied with DGMS field trial permission certification. Details of obtaining DGMS field trial permission are available at the web site of DGMS. The field trial may be carried in any E&P Company operating in India or during the commissioning of the project for it is procured.

14 INSPECTION:

14.1 All the equipments shall be inspected at SUPPLIER works by OIL Engineers to prove the specifications offered before dispatch. The SUPPLIER shall offer all the equipment for inspection by OIL. SUPPLIER shall dispatch the items only after receiving endorsement from OIL inspection team.

14.2 The inspection by the OIL engineers and issue of inspection certificate thereon shall in no way limit the liabilities and responsibilities of the SUPPLIER in commissioning the system as per the specifications indicated in the contract.

15 WARRANTY:

15.1 The SUPPLIER warrants that the equipment are new and of high quality and that the goods will be free of defects in design, materials or workmanship for a period of TWELVE (12) months from the date of successful commissioning / initial operation.

15.2 If within the expiry of the above stipulated guarantee period, the subject equipment or any parts thereof are found defective because of design, workmanship or materials the SUPPLIER at his own expense repair or replace the equipment to the satisfaction of OIL.

15.3 The SUPPLIER shall obtain similar guarantees from each one of his sub-contractors. However the overall responsibility shall lie with the SUPPLIER.

16.0 **Annual maintenance contract:**

The BIDDER shall provide AMC offer for maintaining the Data Acquisition and control system with necessary terms and conditions. Charges for AMC will not be considered for evaluation.AMC will be continued separately after expiary of the warrenty period.

Scope of work:

Type of AMC: Non – Comprehensive AMC

1.0 Software maintenance, system Administration & management:

i) To ensure correction of software option and if necessary reload.
ii) To carry out SAM which comprises the following:
a) Restore back-ups.
b) Core file removal for disc capacity recovery
c) Provide update of the existing version of software free of cost.
d) Graphics and environmental modification if required.
e) Date storage modification at the loop level, configure History, and prepare reports.
f) All other periodic tasks for satisfactory/trouble free system function.
g) To attend to any other fault/problem which may arise in DCS system as a whole other than mentioned above.
h) Number of prevention Maintenance Visits: One visit of 3 days each per year.
I) Emergency / Breakdown Visits: Total two visits any time during the contract period of one year.
j Phone Assistance: To be provided as & when required by us for solving or rectifying any issue related to the DCS system.
EXECUTION METHODOLOGY & LOGISTICS

2.0 PREVENTIVE MAINTENANCE:

Schedule for preventive maintenance visits would be mutually agreed upon by M/s. OIL & the contractor before the visit. M/S OIL will inform the contractor about the date of visit one week in advance.

a)Minimum activities to be taken up during the Preventive Maintenance Visit are:

1. Checking of loads, logical volume sizes in all stations.
2. Checking of CPU load for all Control Modules, and recommending corrective measures if any.
3. Checking Diagnostic logs from system for all nodes. (Operators will keep back up of Diagnostic files in case of overflow due to excess diagnostics, for evaluation purpose).
4. Checking of voltage levels in all power supplies, to ensure within acceptable limits.
5. Check for recent lists of complete / install for errors / warnings.
6. Checking of LED indications on various modules.
7. Backups of the system.
8. Recommendations if any, for the better keep up of the system
9. To check connectivity and healthiness of communication ring.
10. Any modification of existing graphics & creation of new graphics/LOOP FCM's will have to be carried out during the visit as per M/S OIL's requirement.

3.0 EMERGENCY MAINTENANCE:

Definition of Emergency:

Following conditions would lead to an emergency visit

a) Failure of Hardware in the DCS resulting in tripping of unit/plant

b) Failure of Hardware in DCS, which would result in tripping plant, if no corrective action is taken, on an urgent basis.

c) Failure in software/database which will not allow normal DCS operation & would finally trip the plant or effect production.

Actions in Case of Emergency:

a) OIL will inform the contractor through email / fax / phone giving details of failure and diagnostics above through email/fax

b) Contactor’s Engineer will report within 48 hours of above intimation.

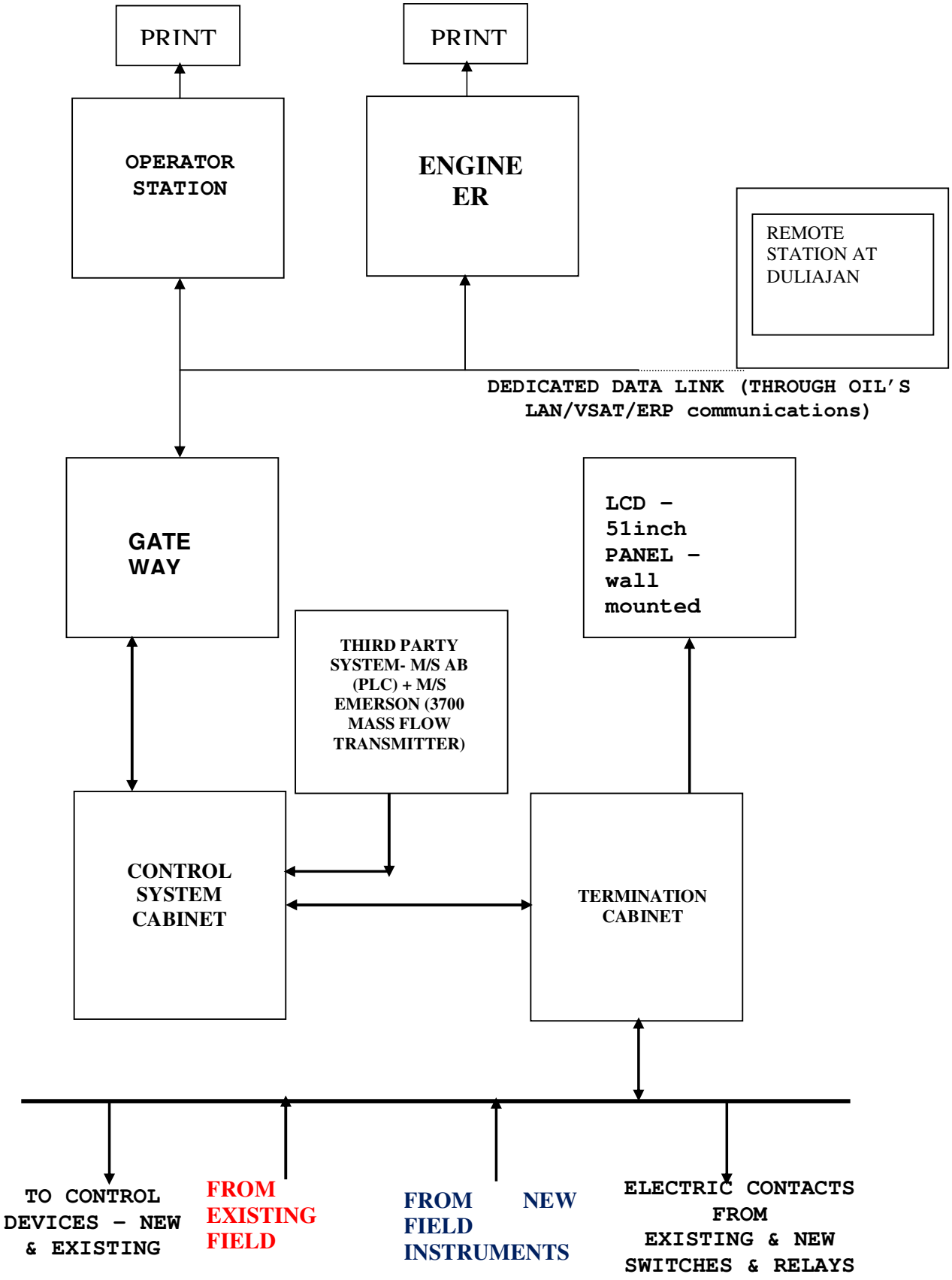
c) Contactor’s Engineer will have to attend the problem and rectify the software / hardware problem at the earliest.

d) Report will be submitted by Contactor’s Engineer within 48 hours of completion of visit.

4. EXCLUSIONS:

1. Failure of any hardware, which is used in the DCS system hardware, will not be covered in this AMC scope.
2. Support for any bought-out hardware items of Third Party Vendors.
3. Support for non-Licenses proprietary Software, will not covered in this AMC scope.
4. Version Upgrade & patches uploading of controllers / Machines and system software will not be covered in this AMC scope.
5. Any goods like Barriers, Relays, Terminals and interconnection Wires etc. which are used in the system but are not basic part of DCS hardware will not be covered in this AMC scope.
6. Spares for the system under AMC are excluded. However a list of critical spares mutually agreed by M/S OIL and the contractor shall be finalized after each preventive maintenance visit.

17.0 **SYSTEM CONFIGURATION**



18.0 EXISTING ANALOG I/O SUMMARY

SL NO	INSTRUMENT	SUPPLIED BY	FUNCTION	LOCATION	REMARKS
1	PT-1001	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:1 AT MANIFOLD, M-101	REFER P&I SKETCH NO: INST/071
2	PT-1002	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:2 AT MANIFOLD, M-101	-DO-
3	PT-1003	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:3 AT MANIFOLD, M-101	-DO-
4	PT-1004	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:4 AT MANIFOLD, M-101	-DO-
5	PT-1005	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:5 AT MANIFOLD, M-101	-DO-
6	PT-1006	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:6 AT MANIFOLD, M-101	-DO-
7	PT-1007	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:7 AT MANIFOLD, M-101	-DO-
8	PT-1008	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:8 AT MANIFOLD, M-101	-DO-
9	PT-1009	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:9 AT MANIFOLD, M-102	-DO-
10	PT-1010	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:10 AT MANIFOLD, M-102	-DO-
11	PT-1011	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:11 AT MANIFOLD M-102	-DO-
12	PT-1012	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:12 AT MANIFOLD, M-102	-DO-
13	PT-1013	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:13 AT MANIFOLD, M-102	-DO-
14	PT-1014	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:14 AT MANIFOLD, M-102	-DO-
15	PT-1015	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:15 AT MANIFOLD, M-102	-DO-

16	PT-1016	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:16 AT MANIFOLD, M-	-DO-

				102	
17	PT-1017	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:17 AT MANIFOLD, M-102	-DO-
18	PT-1201	OIL	CONSOLE INDICATION	PRESSURE OF GROUP UNIT-I, V-101	-DO-
19	PT-1202	OIL	CONSOLE INDICATION	PRESSURE OF GROUP UNIT-I, V-102	-DO-
20	PT-1301	OIL	CONSOLE INDICATION	PRESSURE OF GROUP UNIT-II,V-103	-DO-
21	PT-1302	OIL	CONSOLE INDICATION	PRESSURE OF GROUP UNIT-II,V-104	-DO-
22	PT-1401	OIL	CONSOLE INDICATION	PRESSURE OF EMULSION TREATER-I, V-105	-DO-
23	PT-1402	OIL	CONSOLE INDICATION	PRESSURE OF EMULSION TREATER-II, V-106	-DO-
24	PT-1501	OIL	CONSOLE INDICATION	PRESSURE OF STABILIZER-I, V-107	-DO-
25	PT-1502	OIL	CONSOLE INDICATION	PRESSURE OF STABILIZER-II, V-108	-DO-
26	PT-1601	OIL	CONSOLE INDICATION	PRESSURE OF TEST UNIT-I, V-109	-DO-
27	PT-1602	OIL	CONSOLE INDICATION	PRESSURE OF TEST UNIT-II, V-110	-DO-
28	PT-1701	OIL	CONSOLE INDICATION	PRESSURE OF HPMS-I, V-111	-DO-
29	PT-1702	OIL	CONSOLE INDICATION	PRESSURE OF HPMS-II, V-112	-DO-
30	PT-1801	OIL	CONSOLE INDICATION	PRESSURE OF LPMS-I, V-113	-DO-
31	PT-1802	OIL	CONSOLE INDICATION	PRESSURE OF LPMS-II, V-114	-DO-
32	PT-1803	OIL	CONSOLE INDICATION	PRESSURE OF LPMS-III, V-115	-DO-
33	PT-1901	OIL	CONSOLE INDICATION	PRESSURE OF SERVO TANK, V-116	-DO-
34	PT-2101	OIL	CONSOLE INDICATION	PRESSURE OF CODP OUTLET, M-103	-DO-
35	PT-1018	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:18 AT MANIFOLD, M-102	-DO-
36	PT-1019	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:19 AT MANIFOLD, M-102	-DO-
37	PT-1020	OIL	CONSOLE INDICATION	FLOW LINE PRESSURE OF WELL NO:20 AT MANIFOLD, M-102	-DO-
38	PT-1021	OIL	CONSOLE INDICATION	PRODUCTION HEADER PRESSURE AT HP MANIFOLD, M-101	-DO-
SECTION C **PROCESS MONITORING SYSTEM**					**SH 20 OF 38**
39	PT-1022	OIL	CONSOLE INDICATION	PRODUCTION HEADER PRESSURE AT LP MANIFOLD, M-102	-DO-
40	TT-1101	OIL	CONSOLE	CRUDE OIL OUTLET	-DO-

			INDICATION	TEMP. OF INDIRECT HEATER, IH-101	
41	TT-1102	OIL	CONSOLE INDICATION	CRUDE OIL OUTLET TEMP. OF INDIRECT HEATER, IH-102	-DO-
42	TT-1103	OIL	CONSOLE INDICATION	CRUDE OIL OUTLET TEMP. OF INDIRECT HEATER, IH-103	-DO-

43	TT-1401	OIL	CONSOLE INDICATION	TEMPERATURE OF EMULSION TREATER, V-105	-DO-
44	TT-1402	OIL	CONSOLE INDICATION	TEMPERATURE OF EMULSION TREATER, V-106	-DO-
45	TT-1601	OIL	CONSOLE INDICATION	GAS OUTLET TEMPERATURE OF TEST UNIT-I, V-109	-DO-
46	TT-1602	OIL	CONSOLE INDICATION	GAS OUTLET TEMPERATURE OF TEST UNIT-II, V-110	-DO-
47	TT-1701	OIL	CONSOLE INDICATION	GAS OUTLET TEMPERATURE OF HPMS, V-112	-DO-
48	TT-1801	OIL	CONSOLE INDICATION	GAS OUTLET TEMPERATURE OF LPMS, V-114	-DO-
49	TT-1901	OIL	CONSOLE INDICATION	GAS OUTLET TEMPERATURE OF SERVO TANK, V-115	-DO-
50	TT-1802	OIL	CONSOLE INDICATION	GAS OUTLET TEMPERATURE OF LPMS, V-115	-DO-
51	LT-1201	OIL	CONSOLE INDICATION	LEVEL OF GROUP UNIT-I, V-101	-DO-
52	LT-1202	OIL	CONSOLE INDICATION	LEVEL OF GROUP UNIT-I, V-102	-DO-
53	LT-1301	OIL	CONSOLE INDICATION	LEVEL OF GROUP UNIT-II, V-103	-DO-
54	LT-1302	OIL	CONSOLE INDICATION	LEVEL OF GROUP UNIT-II, V-104	-DO-
55	LT-1401	OIL	CONSOLE INDICATION	LEVEL OF EMULSION TREATER-I, V-105	-DO-
56	LT-1402	OIL	CONSOLE INDICATION	LEVEL OF EMULSION TREATER-II, V-106	-DO-
57	LT-1501	OIL	CONSOLE INDICATION	LEVEL OF STABILIZERR-I, V-107	-DO-
58	LT-1502	OIL	CONSOLE INDICATION	LEVEL OF STABILIZER-II, V-108	-DO-
SECTION C **PROCESS MONITORING SYSTEM**					**SH 21 OF 38**
59	**LT-1601**	**OIL**	**CONSOLE INDICATION**	**LEVEL OF TEST UNIT-I, V-109**	**-DO-**
60	**LT-1602**	**OIL**	**CONSOLE INDICATIO**	**LEVEL OF TEST UNIT-II, V-110**	**-DO-**

			N		
61	LT-2003	OIL	CONSOLE INDICATION	LEVEL OF TEST TANK, T-103	-DO-
62	LT-2001	OIL	CONSOLE INDICATION	LEVEL OF CRUDE OIL STORAGE TANK, T-101	-DO-
63	LT-2002	OIL	CONSOLE INDICATION	LEVEL OF CRUDE OIL STORAGE TANK, T-102	-DO-
64	LT-2004	OIL	CONSOLE INDICATION	LEVEL OF TEST TANK, T-104	-DO-
65	FT-1601	OIL	CONSOLE INDICATION	GAS FLOW OF TEST UNIT-I, V-109	-DO-
66	FT-1602	OIL	CONSOLE INDICATION	GAS FLOW OF TEST UNIT-II, V-110	-DO-
67	FT-1701	OIL	CONSOLE INDICATION	GAS FLOW TO HP DISTRIBUTION OF HPMS V-111	-DO-
68	FT-1702	OIL	CONSOLE INDICATION	GAS FLOW TO HP FLARE OF HPMS, V-111	-DO-
69	FT-1801	OIL	CONSOLE INDICATION	GAS FLOW TO BOOSTER SUCTION AT LPMS, V-112	-DO-
70	FT-1802	OIL	CONSOLE INDICATION	GAS FLOW TO LP FLARE OF LPMS, V-112	-DO-
71	FT-1901	OIL	CONSOLE INDICATION	OUTLET GAS FLOW OF SERVO TANK, V-113	-DO-
72	FT-1803	OIL	CONSOLE INDICATION	OUTLET GAS FLOW TO LP FLARE OF LPMS V115	-DO-
73	WIOM-1401	OIL	CONSOLE INDICATION	WATER PERCENTAGE AT EMULSION TREATER CRUDE OIL OUTLET, V-105	-DO-
74	WIOM-1402	OIL	CONSOLE INDICATION	WATER PERCENTAGE AT EMULSION TREATER CRUDE OIL OUTLET, V-106	-DO-
75	WIOM-2101	OIL	CONSOLE INDICATION	WATER PERCENTAGE AT CODP OUTLET, X-101	-DO-

19.0 EXISTING DIGITAL INPUT SUMMARY

SL NO	INSTRUMENT	SUPPLIED BY	FUNCTION	POWER SUPPLY REQUIRED	REMARKS
1	FS-1101	SUPPLIER	PILOT FLAME STATUS INDICATION OF INDIRECT HEATER IH-101	POTENTIAL FREE CONTACT	THERMO-COUPLE SENSOR WITH TEMPERATURE CONTROLLER FOR FLAME SENSING
2	FS-1102	SUPPLIER	PILOT FLAME STATUS INDICATION OF INDIRECT HEATER IH-102	POTENTIAL FREE CONTACT	-DO-
3	FS-1103	SUPPLIER	PILOT FLAME STATUS INDICATION OF INDIRECT HEATER IH-103	POTENTIAL FREE CONTACT	-DO-
4	FS-1401	SUPPLIER	PILOT FLAME STATUS INDICATION OF EMULSION TREATER, BURNER 1, V-105	POTENTIAL FREE CONTACT	-DO-
5	FS-1402	SUPPLIER	PILOT FLAME STATUS INDICATION OF EMULSION TREATER, BURNER 2, V-105	POTENTIAL FREE CONTACT	-DO-
6	FS-1403	SUPPLIER	PILOT FLAME STATUS INDICATION OF EMULSION TREATER, BURNER 1, V-106	POTENTIAL FREE CONTACT	-DO-
7	FS-1404	SUPPLIER	PILOT FLAME STATUS INDICATION OF EMULSION TREATER, BURNER 2, V-106	POTENTIAL FREE CONTACT	-DO-
8	PRESSURE SWITCH (PS-2101)	SUPPLIER	PUMP STATUS INDICTION OF CODP-I P-101	POTENTIAL FREE CONTACT	
9	PRESSURE SWITCH (PS-2102)	SUPPLIER	PUMP STATUS INDICTION OF CODP-II P-102	POTENTIAL FREE CONTACT	
10	PRESSURE SWITCH (PS-2103)	SUPPLIER	PUMP STATUS INDICTION OF CODP-III P-103	POTENTIAL FREE CONTACT	

11	ELECTRIC CONTACT	OTHERS	PUMP STATUS INDICTION OF FWDP-I P-201	POTENTIAL FREE CONTACT	
12	ELECTRIC CONTACT	OTHERS	PUMP STATUS INDICTION OF FWDP-II P-202	POTENTIAL FREE CONTACT	
13	ELECTRIC CONTACT	OTHERS	PUMP STATUS INDICTION OF FWDP-III P-203	POTENTIAL FREE CONTACT	
14	ELECTRIC CONTACT	OTHERS	PUMP STATUS INDICTION OF SWP-I P-301	POTENTIAL FREE CONTACT	
15	ELECTRIC CONTACT	OTHERS	PUMP STATUS INDICTION OF SWP-II P-302	POTENTIAL FREE CONTACT	
16	ELECTRIC CONTACT	OTHERS	PUMP STATUS INDICTION OF PWP-I P-401	POTENTIAL FREE CONTACT	
17	ELECTRIC CONTACT	OTHERS	PUMP STATUS INDICTION OF PWP-II P-402	POTENTIAL FREE CONTACT	
18	ELECTRIC CONTACT	OTHERS	STATUS OF GENERATOR-I G-101	POTENTIAL FREE CONTACT	
19	ELECTRIC CONTACT	OTHERS	STATUS OF GENERATOR-II G-102	POTENTIAL FREE CONTACT	
20	ELECTRIC CONTACT	OTHERS	DOSING PUMP STATUS INDICTION OF P-501	POTENTIAL FREE CONTACT	
21	ELECTRIC CONTACT	OTHERS	DOSING PUMP STATUS INDICTION OF P-502	POTENTIAL FREE CONTACT	
22	ELECTRIC CONTACT	OTHERS	DOSING PUMP STATUS INDICTION OF P-503	POTENTIAL **FREE CONTACT**	
23	ELECTRIC CONTACT	OTHERS	DOSING PUMP STATUS INDICTION OF P-504	POTENTIAL FREE CONTACT	
24	ELECTRIC CONTACT	OTHERS	DOSING PUMP STATUS INDICTION OF P-505	POTENTIAL FREE CONTACT	
25	ELECTRIC CONTACT	OTHERS	DOSING PUMP STATUS INDICTION OF P-506	POTENTIAL FREE CONTACT	

21	ELECTRIC CONTACT	OTHERS	DOSING PUMP STATUS INDICTION OF P-502	POTENTIAL **FREE CONTACT**	
26	ELECTRIC CONTACT	OTHERS	LAMP TEST	POTENTIAL FREE CONTACT	
27	ELECTRIC CONTACT	OTHERS	ALARM ACK	POTENTIAL FREE CONTACT	

20.0 EXISTING DIGITAL OUTPUT SUMMARY

SL NO	SENSOR	SUPPLIED BY	FUNCTION	CONTACT RATING
1	OUTPUT RELAY CONTACT	SUPPLIER	TO OPERATE THE SOLENOID VALVE (XSV-101) OF THE AUTO-DRAIN SYSTEM OF SERVO TANK	24 VDC, 5 AMPS
2	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR GROUP UNIT-I, V-101	24 VDC, 5 AMPS
3	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR GROUP UNIT-I, V-102	24 VDC, 5 AMPS
4	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR GROUP UNIT-II, V-103	24 VDC, 5 AMPS
5	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR GROUP UNIT-II, V-104	24 VDC, 5 AMPS
6	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR EMULSION TREATER, V-105	24 VDC, 5 AMPS
7	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR EMULSION TREATER, V-106	24 VDC, 5 AMPS
8	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR STABILIZER, V-107	24 VDC, 5 AMPS
9	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR STABILIZER, V-108	24 VDC, 5 AMPS
10	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR TEST UNIT-I, V-109	24 VDC, 5 AMPS
11	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR TEST UNIT-II, V-110	24 VDC, 5 AMPS
12	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR HPMS, V-111	24 VDC, 5 AMPS
13	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR HPMS, V-112	24 VDC, 5 AMPS
14	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR LPMS, V-113	24 VDC, 5 AMPS

15	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR LPMS, V-114	24 VDC, 5 AMPS
16	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR LPMS, V-115	24 VDC, 5 AMPS
17	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR SERVO TANK, V-115	24 VDC, 5 AMPS
18	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE LOW ALARM WITH INDICATION IN MIMIC PANEL FOR SERVO TANK, V-115	24 VDC, 5 AMPS
19	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PRESSURE HIGH ALARM WITH INDICATION IN MIMIC PANEL FOR CODP OUTLET, X-101	24 VDC, 5 AMPS
20	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR INDIRECT HEATER, IH-101	24 VDC, 5 AMPS
21	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR INDIRECT HEATER, IH-102	24 VDC, 5 AMPS
22	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR INDIRECT HEATER, IH-103	24 VDC, 5 AMPS
23	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR EMULSION TREATER, BURNER-I, V-105	24 VDC, 5 AMPS
24	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR EMULSION TREATER, BURNER-II, V-105	24 VDC, 5 AMPS
25	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR EMULSION TREATER, BURNER-I, V-106	24 VDC, 5 AMPS
26	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR EMULSION TREATER, BURNER-II, V-106	24 VDC, 5 AMPS
27	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PUMP STATUS INDICATION IN MIMIC PANEL FOR CODP-I, P-101	24 VDC, 5 AMPS
28	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PUMP STATUS INDICATION IN MIMIC PANEL FOR CODP-I, P-102	24 VDC, 5 AMPS

29	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PUMP STATUS INDICATION IN MIMIC PANEL FOR CODP-I, P-103	24 VDC, 5 AMPS
30	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PUMP STATUS INDICATION IN MIMIC PANEL FOR FWDP-I, P-201	24 VDC, 5 AMPS
31	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PUMP STATUS INDICATION IN MIMIC PANEL FOR FWDP-II, P-202	24 VDC, 5 AMPS
32	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PUMP STATUS INDICATION IN MIMIC PANEL FOR FWDP-III, P-203	24 VDC, 5 AMPS
33	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PUMP STATUS INDICATION IN MIMIC PANEL FOR SWP-I, P-301	24 VDC, 5 AMPS
34	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE PUMP STATUS INDICATION IN MIMIC PANEL FOR SWP-II, P-302	24 VDC, 5 AMPS
35	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE STATUS INDICATION IN MIMIC PANEL FOR GENERATOR-I, G-101	24 VDC, 5 AMPS
36	OUTPUT RELAY CONTACT	SUPPLIER	TO GENERATE STATUS INDICATION IN MIMIC PANEL FOR GENERATOR-II, G-102	24 VDC, 5 AMPS
37	OUTPUT RELAY CONTACT	SUPPLIER	HOOTER ALARM GENERATION	24 VDC, 5 AMPS
38	OUTPUT RELAY CONTACT	SUPPLIER	TANK FILLING INDICATION T-101	24 VDC, 5 AMPS
39	OUTPUT RELAY CONTACT	SUPPLIER	TANK DESPATCHING INDICATION T-101	24 VDC, 5 AMPS
40	OUTPUT RELAY CONTACT	SUPPLIER	TANK FILLING INDICATION T-102	24 VDC, 5 AMPS
41	OUTPUT RELAY CONTACT	SUPPLIER	TANK DESPATCHING INDICATION T-102	24 VDC, 5 AMPS
42	OUTPUT RELAY CONTACT	SUPPLIER	TANK FILLING INDICATION T-103	24 VDC, 5 AMPS
43	OUTPUT RELAY CONTACT	SUPPLIER	TANK DESPATCHING INDICATION T-103	24 VDC, 5 AMPS
44	OUTPUT RELAY CONTACT	SUPPLIER	TANK FILLING INDICATION T-104	24 VDC, 5 AMPS
45	OUTPUT RELAY CONTACT	SUPPLIER	TANK DESPATCHING INDICATION T-104	24 VDC, 5 AMPS
46	OUTPUT RELAY CONTACT	SUPPLIER	STATUS OF DOSING PUMP P-501	24 VDC, 5 AMPS
47	OUTPUT RELAY CONTACT	SUPPLIER	STATUS OF DOSING PUMP P-502	24 VDC, 5 AMPS
48	OUTPUT RELAY CONTACT	SUPPLIER	STATUS OF DOSING PUMP P-503	24 VDC, 5 AMPS
49	OUTPUT RELAY CONTACT	SUPPLIER	STATUS OF DOSING PUMP P-504	24 VDC, 5 AMPS
50	OUTPUT RELAY	SUPPLIER	STATUS OF DOSING PUMP P-505	24 VDC, 5

	CONTACT			AMPS
SECTION C **PROCESS MONITORING SYSTEM** **SH 28 OF 38**				
51	OUTPUT RELAY CONTACT	SUPPLIER	STATUS OF DOSING PUMP P-506	24 VDC, 5 AMPS
52	OUTPUT RELAY CONTACT	SUPPLIER	CONTROL RECYCLING VALVE IN THE ET V-105	24 VDC, 5 AMPS
53	OUTPUT RELAY CONTACT	SUPPLIER	CONTROL RECYCLING VALVE IN THE ET V-106	24 VDC, 5 AMPS
54	OUTPUT RELAY CONTACT	SUPPLIER	SOLENOID VALVE TO DE-ENERGIZE THE PUMP P-101	24 VDC, 5 AMPS
55	OUTPUT RELAY CONTACT	SUPPLIER	SOLENOID VALVE TO DE-ENERGIZE THE PUMP P-102	24 VDC, 5 AMPS
56	OUTPUT RELAY CONTACT	SUPPLIER	SOLENOID VALVE TO DE-ENERGIZE THE PUMP P-103	24 VDC, 5 AMPS

21.0 EXISTING CLOSED LOOP CONTROLS

SL NO	SENSOR	SUPPLIED BY	FUNCTION	LOCATION	POWER SUPPLY REQUIRED FOR TRANSMI T-TER	REMARKS
1	PT-1201	SUPPLIER	a) CONSOLE INDICATION b) CONTROL ACTION ON CONTROL VALVE PCV-1201	GROUP UNIT I V-101	+24 VDC	TRANSMI-TTER OUTPUT IS 4-20MA DC. SIGNAL TO CONTROL VALVE IS 3-15 PSI. THE CONTROL VALVE (PNUEMATIC TYPE) IS IN THE SCOPE OF OIL
2	PT-1202	SUPPLIER	c) CONSOLE INDICATION d) CONTROL ACTION ON CONTROL VALVE PCV-1202	GROUP UNIT I V-102	+24 VDC	-do-
3	PT-1301	SUPPLIER	e) CONSOLE INDICATION f) CONTROL ACTION ON CONTROL VALVE PCV-1301	GROUP UNITII V-103	+24 VDC	-do-
4	PT-1302	SUPPLIER	g) CONSOLE INDICATION h) CONTROL ACTION ON CONTROL VALVE PCV-1302	GROUP UNITII V-104	+24 VDC	-do-
5	PT-1401	SUPPLIER	i) CONSOLE INDICATION j) CONTROL ACTION ON CONTROL VALVE PCV-1401	EMULSION TREATER V-105	+24 VDC	-do-

6	PT-1402	SUPPLIER	k) CONSOLE INDICATION l) CONTROL ACTION ON CONTROL VALVE PCV-1402	EMULSION TREATER V-106	+24 VDC	-do-
7	PT-1501	SUPPLIER	m) CONSOLE INDICATION n) CONTROL ACTION ON CONTROL VALVE PCV-1501	STABILIZER V-107	+24 VDC	-do-
8	PT-1502	SUPPLIER	o) CONSOLE INDICATION p) CONTROL ACTION ON CONTROL VALVE PCV-1502	STABILIZER V-108	+24 VDC	-do-
9	PT-1601	SUPPLIER	q) CONSOLE INDICATION r) CONTROL ACTION ON CONTROL VALVE PCV-1601	TEST UNIT-I V-109	+24 VDC	-do-
10	PT-1602	SUPPLIER	s) CONSOLE INDICATION t) CONTROL ACTION ON CONTROL VALVE PCV-1602	TEST UNIT-I V-110	+24 VDC	-do-
11	PT-1701	SUPPLIER	u) CONSOLE INDICATION v) CONTROL ACTION ON CONTROL VALVE PCV-1701	HPMS-I V-111	+24 VDC	-do-

12	PT-1702	SUPPLIER	w) CONSOLE INDICATION x) CONTROL ACTION ON CONTROL VALVE PCV-1702-A	HPMS-II V-112	+24 VDC	-do-
13	PT-1702	SUPPLIER	y) CONSOLE INDICATION z) CONTROL ACTION ON CONTROL VALVE PCV-1702-B	HPMS-II V-112	+24 VDC	-do-
14	PT-1801	SUPPLIER	aa) CONSOLE INDICATION bb) CONTROL ACTION ON CONTROL VALVE PCV-1801	LPMS-I V-113	+24 VDC	-do-
15	PT-1802	SUPPLIER	cc) CONSOLE INDICATION dd) CONTROL ACTION ON CONTROL VALVE PCV-1802-A	LPMS-II V-114	+24 VDC	-do-
16	PT-1802	SUPPLIER	ee) CONSOLE INDICATION ff) CONTROL ACTION ON CONTROL VALVE PCV-1802-B	LPMS-II V-114	+24 VDC	-do-
17	PT-1803	SUPPLIER	gg) CONSOLE INDICATION hh) CONTROL ACTION ON CONTROL VALVE PCV-1803	LPMS-III V-115	+24 VDC	-do-
18	PT-1901	SUPPLIER	ii) CONSOLE INDICATION jj) CONTROL ACTION ON CONTROL VALVE PCV-1802	SERVO TANK V-116	+24 VDC	-do-

19	TT-1401	SUPPLIER	kk) CONSOLE INDICATION ll) CONTROL ACTION ON CONTROL VALVE TCV-1401	EMULSION TREATER V-105	+24 VDC	-do-
20	TT-1402	SUPPLIER	mm) CONSOLE INDICATION nn) CONTROL ACTION ON CONTROL VALVE TCV-1402	EMULSION TREATER V-106	+24 VDC	-do-

22.0 NEW I/O LIST:

Sl. No.	Location	Inst TAG	IO TYPE	Description
1	M-101A	PT-1023	AI	PRODUCTION HEADER PRESSURE AT HP MANIFOLD, M-101A
2	M-101B	PT-1024	AI	PRODUCTION HEADER PRESSURE AT HP MANIFOLD, M-101B
3	M-101C	PT-1025	AI	PRODUCTION HEADER PRESSURE AT HP MANIFOLD, M-101C
4	M-101D	PT-1026	AI	PRODUCTION HEADER PRESSURE AT HP MANIFOLD, M-101D
5	M-101A	PT-1027	AI	FLOW LINE PRESSURE OF WELL NO:1 AT HP MANIFOLD, M-101A
6	M-101A	PT-1028	AI	FLOW LINE PRESSURE OF WELL NO:2 AT HP MANIFOLD, M-101A
7	M-101A	PT-1029	AI	FLOW LINE PRESSURE OF WELL NO:3 AT HP MANIFOLD, M-101A
8	M-101A	PT-1030	AI	FLOW LINE PRESSURE OF WELL NO:4 AT HP MANIFOLD, M-101A
9	M-101A	PT-1031	AI	FLOW LINE PRESSURE OF WELL NO:5 AT HP MANIFOLD, M-101A
10	M-101A	PT-1032	AI	FLOW LINE PRESSURE OF WELL NO:6 AT HP MANIFOLD, M-101A
11	M-101A	PT-1033	AI	FLOW LINE PRESSURE OF WELL NO:7 AT HP MANIFOLD, M-101A
12	M-101A	PT-1034	AI	FLOW LINE PRESSURE OF WELL NO:8 AT HP MANIFOLD, M-101A
13	M-101A	PT-1035	AI	FLOW LINE PRESSURE OF WELL NO:9 AT HP MANIFOLD, M-101A
14	M-101A	PT-1036	AI	FLOW LINE PRESSURE OF WELL NO:10 AT HP MANIFOLD, M-101A
15	M-101B	PT-1037	AI	FLOW LINE PRESSURE OF WELL NO:1 AT HP MANIFOLD, M-101B
16	M-101B	PT-1038	AI	FLOW LINE PRESSURE OF WELL NO:2 AT HP MANIFOLD, M-101B
17	M-101B	PT-1039	AI	FLOW LINE PRESSURE OF WELL NO:3 AT HP MANIFOLD, M-101B
18	M-101B	PT-1040	AI	FLOW LINE PRESSURE OF WELL NO:4 AT HP MANIFOLD, M-101B
19	M-101C	PT-1041	AI	FLOW LINE PRESSURE OF WELL NO:1 AT HP MANIFOLD, M-101C
20	M-101C	PT-1042	AI	FLOW LINE PRESSURE OF WELL NO:2 AT HP MANIFOLD, M-101C
21	M-101C	PT-1043	AI	FLOW LINE PRESSURE OF WELL NO:3 AT HP MANIFOLD, M-101C
22	M-101C	PT-1044	AI	FLOW LINE PRESSURE OF WELL NO:4 AT HP MANIFOLD, M-101C

23	M-101C	PT-1045	AI	FLOW LINE PRESSURE OF WELL NO:5 AT HP MANIFOLD, M-101C

24	M-101C	PT-1046	AI	FLOW LINE PRESSURE OF WELL NO:6 AT HP MANIFOLD, M-101C
25	M-101C	PT-1047	AI	FLOW LINE PRESSURE OF WELL NO:7 AT HP MANIFOLD, M-101C
26	M-101C	PT-1048	AI	FLOW LINE PRESSURE OF WELL NO:8 AT HP MANIFOLD, M-101C
27	M-101C	PT-1049	AI	FLOW LINE PRESSURE OF WELL NO:9 AT HP MANIFOLD, M-101C
28	M-101C	PT-1050	AI	FLOW LINE PRESSURE OF WELL NO:10 AT HP MANIFOLD, M-101C
29	M-101D	PT-1051	AI	FLOW LINE PRESSURE OF WELL NO:1 AT HP MANIFOLD, M-101D
30	M-101D	PT-1052	AI	FLOW LINE PRESSURE OF WELL NO:2 AT HP MANIFOLD, M-101D
31	M-101D	PT-1053	AI	FLOW LINE PRESSURE OF WELL NO:3 AT HP MANIFOLD, M-101D
32	M-101D	PT-1054	AI	FLOW LINE PRESSURE OF WELL NO:4 AT HP MANIFOLD, M-101D
33	M-101D	PT-1055	AI	FLOW LINE PRESSURE OF WELL NO:5 AT HP MANIFOLD, M-101D
34	M-101D	PT-1056	AI	FLOW LINE PRESSURE OF WELL NO:6 AT HP MANIFOLD, M-101D
35	M-101D	PT-1057	AI	FLOW LINE PRESSURE OF WELL NO:7 AT HP MANIFOLD, M-101D
36	M-101D	PT-1058	AI	FLOW LINE PRESSURE OF WELL NO:8 AT HP MANIFOLD, M-101D
37	M-101D	PT-1059	AI	FLOW LINE PRESSURE OF WELL NO:9 AT HP MANIFOLD, M-101D
38	M-101D	PT-1060	AI	FLOW LINE PRESSURE OF WELL NO:10 AT HP MANIFOLD, M-101D
39	M-102A	PT-1061	AI	PRODUCTION HEADER PRESSURE AT LP MANIFOLD, M-102A
40	M-102B	PT-1062	AI	PRODUCTION HEADER PRESSURE AT LP MANIFOLD, M-102B
41	M-102C	PT-1063	AI	PRODUCTION HEADER PRESSURE AT LP MANIFOLD, M-102C
42	M-102A	PT-1064	AI	FLOW LINE PRESSURE OF WELL NO:1 AT LP MANIFOLD, M-102A
43	M-102A	PT-1065	AI	FLOW LINE PRESSURE OF WELL NO:2 AT LP MANIFOLD, M-102A
44	M-102A	PT-1066	AI	FLOW LINE PRESSURE OF WELL NO:3 AT LP MANIFOLD, M-102A
45	M-102B	PT-1067	AI	FLOW LINE PRESSURE OF WELL NO:1 AT HP MANIFOLD, M-102B
46	M-102B	PT-1068	AI	FLOW LINE PRESSURE OF WELL NO:2 AT HP MANIFOLD, M-102B
47	M-102B	PT-1069	AI	FLOW LINE PRESSURE OF WELL NO:3 AT HP MANIFOLD, M-102B

48	M-102C	PT-1070	AI	FLOW LINE PRESSURE OF WELL NO:1 AT HP MANIFOLD, M-102C

49	M-102C	PT-1071	AI	FLOW LINE PRESSURE OF WELL NO:2 AT HP MANIFOLD, M-102C
50	M-102C	PT-1072	AI	FLOW LINE PRESSURE OF WELL NO:3 AT HP MANIFOLD, M-102BC
51	M-102C	PT-1073	AI	FLOW LINE PRESSURE OF WELL NO:4 AT HP MANIFOLD, M-102C
52	M-102C	PT-1074	AI	FLOW LINE PRESSURE OF WELL NO:5 AT HP MANIFOLD, M-102C
53	M-102C	PT-1075	AI	FLOW LINE PRESSURE OF WELL NO:6 AT HP MANIFOLD, M-102C
54	M-102C	PT-1076	AI	FLOW LINE PRESSURE OF WELL NO:7 AT HP MANIFOLD, M-102C
55	M-102C	PT-1077	AI	FLOW LINE PRESSURE OF WELL NO:8 AT HP MANIFOLD, M-102C
56	M-102C	PT-1078	AI	FLOW LINE PRESSURE OF WELL NO:9 AT HP MANIFOLD, M-102C
57	M-102C	PT-1079	AI	FLOW LINE PRESSURE OF WELL NO:10 AT HP MANIFOLD, M-102C
58	M-102C	PT-1080	AI	FLOW LINE PRESSURE OF WELL NO:12 AT LP MANIFOLD, M-102C
59	M-102C	PT-1081	AI	FLOW LINE PRESSURE OF WELL NO:13 AT LP MANIFOLD, M-102C
60	M-102C	PT-1082	AI	FLOW LINE PRESSURE OF WELL NO:14 AT LP MANIFOLD, M-102C
61	IH-1	TT-1104	AI	CRUDE OIL INLET TEMP. OF INDIRECT HEATER, IH-104
62	IH-1	TT-1106	AI	CRUDE OIL BATH TEMP. OF INDIRECT HEATER, IH-104
63	IH-1	TT-1108	AI	CRUDE OIL OUTLET TEMP. OF INDIRECT HEATER, IH-104
64	IH-1	OUTPUT RELAY CONTACT	DO	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR IH
65	IH-1	OUTPUT RELAY CONTACT	DO	TEMP HIGH IH
66	IH-2	TT-1105	AI	CRUDE OIL INLET TEMP. OF INDIRECT HEATER, IH-105
67	IH-2	TT-1107	AI	CRUDE OIL BATH TEMP. OF INDIRECT HEATER, IH-105
68	IH-2	TT-1109	AI	CRUDE OIL OUTLET TEMP. OF INDIRECT HEATER, IH-105
69	IH-2	OUTPUT RELAY CONTACT	DO	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR IH
70	IH-2	OUTPUT RELAY CONTACT	DO	TEMP HIGH IH
71	IH BMS-1	FS-1104	DI	PILOT FLAME STATUS OF IH-104
72	IH BMS-2	FS-1105	DI	PILOT FLAME STATUS OF IH-105

73	GU-1(3)	PT-1203	AIC	PRESSURE OF GROUP UNIT-I, V-117
74	GU-1(4)	PT-1204	AIC	PRESSURE OF GROUP UNIT-I, V-118

75	GU-1(3)	LT-1203	AIC	LEVEL OF GROUP UNIT-I, V-117
76	GU-1(4)	LT-1204	AIC	LEVEL OF GROUP UNIT-I, V-118
77	GU-1(3)	PCV-1203	AOC	PRESSURE OF GROUP UNIT-I, V-117
78	GU-1(4)	PCV-1204	AOC	PRESSURE OF GROUP UNIT-I, V-118
79	GU-1(3)	LCV-1203	AOC	LEVEL OF GROUP UNIT-I, V-117
80	GU-1(4)	LCV-1204	AOC	LEVEL OF GROUP UNIT-I, V-118
81	GU-1(3)	OUTPUT RELAY CONTACT	DO	PRESSURE HIGH GU
82	GU-1(4)	OUTPUT RELAY CONTACT	DO	PRESSURE HIGH GU
83	GU-2(3)	PT-1303	AIC	PRESSURE OF GROUP UNIT-II, V-119
84	GU-2(4)	PT-1304	AIC	PRESSURE OF GROUP UNIT-II, V-120
85	GU-2(3)	LT-1303	AIC	LEVEL OF GROUP UNIT-I, V-119
86	GU-2(4)	LT-1304	AIC	LEVEL OF GROUP UNIT-I, V-120
87	GU-2(3)	PCV-1303	AOC	PRESSURE OF GROUP UNIT-I, V-119
88	GU-2(4)	PCV-1304	AOC	PRESSURE OF GROUP UNIT-I, V-120
89	GU-2(3)	LCV-1303	AOC	LEVEL OF GROUP UNIT-I, V-119
90	GU-2(4)	LCV-1304	AOC	LEVEL OF GROUP UNIT-I, V-120
91	GU-2(3)	OUTPUT RELAY CONTACT	DO	PRESSURE HIGH GU
92	GU-2(4)	OUTPUT RELAY CONTACT	DO	PRESSURE HIGH GU
93	ET BMS-1	FS-1405	DI	PILOT FLAME STATUS OF V-121
94	ET BMS-1	FS-1408	DI	PILOT FLAME STATUS OF V-121
95	ET BMS-2	FS-1406	DI	PILOT FLAME STATUS OF V-122
96	ET BMS-2	FS-1409	DI	PILOT FLAME STATUS OF V-122
97	ET-1	PT-1403	AIC	PRESSURE OF EMULSION TREATER, V-121
98	ET-1	PCV-1403	AOC	PRESSURE OF EMULSION TREATER, V-121
99	ET-1	LT-1403	AIC	LEVEL OF EMULSION TREATER, V-121
100	ET-1	LT-1406	AIC	INT. LEVEL OF EMULSION TREATER, V-121
101	ET-1	LT-1409	AIC	INT. LEVEL OF EMULSION TREATER, V-121
102	ET-1	LCV-1403	AOC	LEVEL OF EMULSION TREATER, V-121
103	ET-1	LCV-1406	AOC	INT. LEVEL OF EMULSION TREATER, V-121
104	ET-1	LCV-1409	AOC	INT. LEVEL OF EMULSION TREATER, V-121
105	ET-1	WIOM-1403	AI	WATER PERCENTAGE AT EMULSION TREATER CRUDE OIL OUTLET,V-121
106	ET-1	TT-1405	AIC	TEMPERATURE OF EMULSION TREATER, V-123
107	ET-1	TT-1408	AI	CRUDE OUTLET TEMPERATURE OF EMULSION TREATER, V-123
108	ET-1	TCV-1405	AOC	TEMPERATURE OF EMULSION TREATER, V-123

109	ET-1	OUTPUT RELAY CONTACT	DO	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR ET
110	ET-1	OUTPUT RELAY CONTACT	DO	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR ET
111	ET-1	OUTPUT RELAY CONTACT	DO	LEVEL HIGH ET
112	ET-1	OUTPUT RELAY CONTACT	DO	PRESSURE HIGH ET
113	ET-1	OUTPUT RELAY CONTACT	DO	TEMP HIGH ET
114	ET-2	PT-1404	AIC	PRESSURE OF EMULSION TREATER, V-122
115	ET-2	PCV-1404	AOC	PRESSURE OF EMULSION TREATER, V-122
116	ET-2	LT-1404	AIC	LEVEL OF EMULSION TREATER, V-122
117	ET-2	LT-1407	AIC	INT. LEVEL OF EMULSION TREATER, V-122
118	ET-2	LT-1410	AIC	INT. LEVEL OF EMULSION TREATER, V-122
119	ET-2	LCV-1404	AOC	LEVEL OF EMULSION TREATER, V-122
120	ET-2	LCV-1407	AOC	INT. LEVEL OF EMULSION TREATER, V-122
121	ET-2	LCV-1410	AOC	INT. LEVEL OF EMULSION TREATER, V-122
122	ET-2	WIOM-1404	AI	WATER PERCENTAGE AT EMULSION TREATER CRUDE OIL OUTLET,V-122
123	ET-2	TT-1406	AIC	TEMPERATURE OF EMULSION TREATER, V-124
124	ET-2	TT-1409	AI	CRUDE OUTLET TEMPERATURE OF EMULSION TREATER, V-124
125	ET-2	TCV-1406	AOC	TEMPERATURE OF EMULSION TREATER, V-124
126	ET-2	OUTPUT RELAY CONTACT	DO	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR ET
127	ET-2	OUTPUT RELAY CONTACT	DO	TO GENERATE FLAME FAILURE ALARM WITH INDICATION IN MIMIC PANEL FOR ET
128	ET-2	OUTPUT RELAY CONTACT	DO	LEVEL HIGH ET
129	ET-2	OUTPUT RELAY CONTACT	DO	PRESSURE HIGH ET
130	ET-2	OUTPUT RELAY CONTACT	DO	TEMP HIGH ET
131	TU	LT-1603	AIC	LEVEL OF TEST UNIT-I, V-124
132	TU	LT-1604	AIC	LEVEL OF TEST UNIT-I, V-125
133	TU	LCV-1603	AOC	LEVEL OF TEST UNIT-I, V-124
134	TU	LCV-1604	AOC	LEVEL OF TEST UNIT-I, V-125
135	TU	OUTPUT RELAY CONTACT	DO	PRESSURE HIGH TU
136	TU	OUTPUT	DO	PRESSURE HIGH TU

		RELAY CONTACT		

SECTION C

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137		OUTPUT RELAY CONTACT	DO	HOOTER ALARM GENERATION
138	HPMS-1	LT-2201	AIC	LEVEL OF HPMS, HPMS-1
139	HPMS-1	LCV-2201	AOC	LEVEL OF HPMS, HPMS-1
140	HPMS-1	OUTPUT RELAY CONTACT	DO	LEVEL HIGH HPMS
141	HPMS-2	LT-2202	AIC	LEVEL OF HPMS, HPMS-2
142	HPMS-2	LCV-2202	AOC	LEVEL OF HPMS, HPMS-2
143	HPMS-2	OUTPUT RELAY CONTACT	DO	LEVEL HIGH HPMS
144	LPMS-1	LT-2301	AIC	LEVEL OF LPMS, LPMS-1
145	LPMS-1	LCV-2301	AOC	LEVEL OF LPMS, LPMS-1
146	LPMS-1	OUTPUT RELAY CONTACT	DO	LEVEL HIGH LPMS
147	LPMS-2	LT-2302	AIC	LEVEL OF LPMS, LPMS-2
148	LPMS-2	LCV-2302	AOC	LEVEL OF LPMS, LPMS-2
149	LPMS-2	OUTPUT RELAY CONTACT	DO	LEVEL HIGH LPMS
150	SS-1	LT-2401	AIC	LEVEL OF SERVO SCRUBBER
151	SS-1	LCV-2401	AOC	LEVEL OF SERVO SCRUBBER
152	SS-1	OUTPUT RELAY CONTACT	DO	LEVEL HIGH SS-1
153	VLPMS	LT-2501	AIC	LEVEL OF VLPMS
154	VLPMS	LCV-2501	AOC	LEVEL OF VLPMS
155	VLPMS	OUTPUT RELAY CONTACT	DO	LEVEL HIGH VLPMS
156	CODP	WIOM-2116	AI	WIOM CODP DISCH.
157	CODP-1	PT-2102	AI	SUCTION PRESSURE OF P-104
158	CODP-1	PT-2103	AI	DISCH PRESSURE OF P-104
159	CODP-1	PS-2102	DI	HIGH/LOW PRSSUREPUMP TRIP P-104
160	CODP-1	EIECTRIC CONT	DI	STATUS INDICATION OFPUMP P-104
161	CODP-1	OUTPUT RELAY CONTACT	DO	TO GENERATE STATUS INDICATION IN MIMIC PANEL FOR P-104
162	CODP-2	PT-2104	AI	SUCTION PRESSURE OF P-105
163	CODP-2	PT-2105	AI	DISCH PRESSURE OF P-105
164	CODP-2	PS-2103	DI	HIGH/LOW PRSSUREPUMP TRIP P-105
165	CODP-2	EIECTRIC CONT	DI	STATUS INDICATION OFPUMP P-105
166	CODP-2	OUTPUT RELAY CONTACT	DO	TO GENERATE STATUS INDICATION IN MIMIC PANEL FOR P-105
167	TT	LT-2301	AI	LEVEL OF TEST TANK
168	TT	EIECTRIC CONT	DO	STATUS INDICATION TEST TANK

***** Note: In case of LCD display panel for MIMIC function the requirement of digital output cards will be eliminated as the panel can communicate with the processor/server via Ethernet/serial communication media.**

23.0. **Tentative New Field Instruments List:**

Sl.No.	Item	New Qnty	Remarks
1	Pressure Transmitter(PT)	6	Supplier has to connect with new system supplied by them
2	Diaphragm Seal Pressure Transmitter	64	-do-
3	Temp. Transmitter with RTD (TT)	10	-do-
4	RADAR Tank Level Gauge	(1)	-do-
5	Guided Wave RADAR Level Transmitter(LT)	14	-do-
6	Guided Wave Interphase Level Transmitter(ILT)	4	-do-
7	Water in Oil Monitor	3	-do-
8	Pressure Switch with Diaphragm Seal	2	-do-
9	Current to Pneumatic (I/P) Converter	26	-do-
10	Pilot Flame monitor with Thermocouple	6	Considering two burners in ET

Note: The above list is indicative only and bidder is requested to prepare their own estimate based on the new I/O requirements projected above.

24.0 MODBUS SIGNALS

SL NO	INSTRUMENT	SUPPLIED BY	FUNCTION
1	M/s Allen Bradley Make, Model:1794-L34B,Flexlogix 5434 PLC processor	M/s Gastech	TO CONNECT WITH THE CONTROLLER THROUGH RS-485/RS-232 INTERFACE WITH MODBUS PROTOCOL
2	MASS FLOW METER	OIL	TO CONNECT WITH THE CONTROLLER THROUGH RS-485/RS-232 INTERFACE WITH MODBUS PROTOCOL

1.0 SOFTWARE DATA SHEET

SL NO	DESCRIPTION	CONFORMITY TO BE TICK MARKED
	GENERAL	
1	SOFTWARE SCOPE OF SUPPLY (REFER NOTE-1)	
2	ALL SOFTWARE SHALL BE PROVEN IN SIMILLAR PROJECTS	
	SOFTWARE REQUIREMENT	
3	REAL TIME OPERATING SYSTEM (REFER NOTE-2)	
4	BACKGROUND EXECUTIVE (REFER NOTE-3)	
5	DATA ACQUISITION, PROCESSING, ALARM MONITORING, REPORTING (REFER NOTE-4)	
6	OPEN AND CLOSED LOOP CONTROL SOFTWARE (REFER NOTE-5)	
7	REPORT AND DISPLAY GENERATION UTILITY (REFER NOTE-6)	
8	DATA BASE MANAGEMENT UTILITY (REFER NOTE-7)	
9	FILE HANDLING UTILITY (REFER NOTE-8)	
10	COMMUNICATION UTILITY (REFER NOTE-9)	
11	ON-LINE SYSTEM BACKUP UTILITY (REFER NOTE-10)	
12	ON-LINE DIAGNOSTICS UTILITY (REFER NOTE-11)	
13	SCREEN EDITOR	
14	UTILITIES FOR SOFTWARE DEVELOPMENT (REFER NOTE-12)	
15	ON-LINE DEBUGGER AND DOWN LOADER (REFER NOTE-13)	
16	MAN-MACHINE INTERFACE SOFTWARE (REFER NOTE-14)	
17	LOG GENERATOR (REFER NOTE-15)	
18	UTILITY FOR DATA TRANSFER FROM MAGNETIC TAPE TO DISK AND VICE VERSA (REFER NOTE-16)	
19	AGA-3 GAS FLOW MEASUREMENT PACKAGE (REFER NOTE-17)	
20	TEST AND MAINTENANCE PROGRAMS (REFER NOTE-18)	
21	ANTI-VIRUS VACCINE/ DETECTION UTILITY (REFER NOTE-19)	

NOTES:

NOTE-1: THE SOFTWARE TO BE SUPPLIED UNDER THE SPECIFICATION SHALL INCLUDE BUT NOT BE LIMITED TO THE ABOVE TO PERFORM ALL THE FUNCTIONS SPECIFIED UNDER THIS SPECIFICATIONS. THE VENDOR SHALL HAVE THE TOTAL RESPONSIBILITY FOR THE DESIGN, DEVELOPMENT AND IMPLEMENTATION OF SOFTWARE FOR THE ENTIRE I&C SYSTEM.

NOTE-2: THE REAL TIME OPERATING SYSTEM (RTOS) SUPPLIED SHALL BE PROVEN FOR SIMILLAR APPLICATIONS AND SHALL BE ABLE TO SUPPORT ALL THE EQUIPMENT/ PERIPHERALS. THE RTOS SHALL BE SUITABLE FOR EXECUTING ALL THE TASKS AS STIPULATED IN THIS SPECIFICATION.

NOTE-3: THE BACK GROUND EXECUTIVE SHALL ENABLE SOFTWARE DEVELOPMENT IN BACKGROUND TIME SHARING MODE BY TWO OR MORE PROGRAMMERS SIMULTANEOUSLY. IT SHALL BE POSSIBLE TO RUN/ TEST ANY PROGRAM WITHOUT MAKING INTO AN ONLINE PROGRAM.

NOTE-4: THE DATA ACQUISITION, PROCESSING AND ALARM MONITORING/ REPORTING SOFTWARE RESIDENT IN EACH CPU SHALL ENABLE PROCESSING OF RAW PROCESS DATA INCLUDING ENGINEERING UNIT CONVERSION AND PROCESS ALARM LIMIT CHECKING.

NOTE-5: THE CONTROL SOFTWARE RESIDENT IN EACH CPU'S SHALL ENABLE THE EXECUTION OF BOTH MODULATING AND SEQUENTIAL CONTROL WITHOUT INTERRUPTS TO ENSURE SECURITY OF CONTROL SOFTWARE FOR PERFORMING MATHEMATICAL FUNCTION ROUTINES/ ALGORITHMS AND LOGIC ROUTINES FOR CO-ORDINATED MASTER CONTROL AND OTHER CONTROL LOOPS SPECIFIED. THE GENERATION OF CONTROL SOFTWARE SHALL BE BASED ON LOGIC BLOCKS AND LADDER DIAGRAMS AND NO PROGRAMMING LANGUAGE IS NECESSARY.

NOTE-6: REPORT/ DISPLAY OPERATOR SHALL FACILITATE CREATION OF REPORTS AND GRAPHIC DISPLAYS IN USER DEFINABLE FORMATS AND THERE SHALL BE NO NEED TO WRITE PROGRAMMES FOR GENERATION AND MAINTENANCE OF DISPLAYS. THE UTILITY SHALL BE USER FRIENDLY.

NOTE-7: DATA BASE MANAGEMENT UTILITY SHALL BE PROVIDED FOR GENERATION AND MAINTENANCE OF PLANT INPUT DATA BASE. THE PLANT INPUT DATA BASE IMPLEMENTED IN C&I SYSTEM SHALL BE THE MASTER DATABASE.

NOTE-8: FILE HANDLING UTILITY SHALL ALLOW COPYING OF ONE FILE IN PART AS WHOLE INTO ANOTHER, COPYING FROM ONE MEDIUM TO ANOTHER, TYPING THE FILE CONTENTS ON CRT WITHOUT ENTERING EDIT MODE.

NOTE-9: COMMUNICATION UTILITY SHALL ENABLE DATA TRANSFER BETWEEN DIFFERENT STATIONS AND REMOTE STATIONS THROUGH A DEDICATED MODEM LINK.

NOTE-10: ON-LINE SYSTEM BACK-UP UTILITY SHALL FACILITATE SYSTEM BACK-UP WHILE THE SYSTEM IS ON-LINE AND THERE SHALL BE NO NEED TO TAKE THE SYSTEM IN STAND ALONE MODE FOR DOING THE BACK-UP

NOTE-11: ON-LINE DIAGNOSTIC UTILITY SHALL ENABLE ON-LINE OR OFF-LINE TESTING OF ALL DISTRIBUTED MODULES AS WELL AS THE DATA BUS COMMUNICATION SYSTEM. THE ON-LINE DIAGNOSTICS SHALL RUN DURING THE NORMAL FUNCTIONING OF THE DISTRIBUTED MODULES WITHOUT INTERFERING WITH THE REAL TIME PERFORMANCE OF THE SYSTEM. IF ANY MAL-FUNCTION IS DETECTED IN A MODULE, IT SHALL BE DISABLED AUTOMATICALLY AND AN ALARM MESSAGE SHALL BE REPORTED TO THE OPERATOR.

NOTE-12: BIDDER SHALL INCLUDE ALL USER FRIENDLY UTILITIES FOR ENABLING THE USER TO DEVELOP SOFTWARE FOR THE PLANT WITHOUT ANY PRIOR KNOWLEDGE ON THE PROGRAMMING ASPECTS.

NOTE-13: DEBUGGING UTILITY SHALL ALLOW ON-LINE DEBUGGING OF PROGRAMMES. THE DOWN LOADING UTILITY SHALL ENABLE DOWN LOADING OF ALL PROGRAMS DEVELOPED AT PROGRAMMER'S WORK STATION TO THE RESPECTIVE DISTRIBUTED MODULES.

NOTE-14: MAN-MACHINE INTERFACE (MMI) SOFTWARE SHALL ENABLE THE OPERATOR TO CALL UP DISPLAYS AND CONTROL THE PROCESS THROUGH CRT/ KEYBOARD.

NOTE-15: LOG GENERATOR SHALL ACCESS THE PLANT DATA BASE FOR NECESSARY DATA AND INITIATE PRINTING OF LOGS AND REPORTS AS SPECIFIED.

NOTE-16: THE UTILITY FOR COPYING OF FILES FROM MAGNETIC TAPE TO DISK AND VICE VERSA SHALL HAVE CAPABILITY TO READ/ WRITE IN BOTH ASCII/ EBCDIC MODE. IT SHALL ALSO HAVE CAPABILITY TO READ FROM ONE MEDIUM IN ANY MODE AND WRITE ON ANOTHER MEDIUM IN DIFFERENT MODE. IT SHALL ALSO HAVE THE CAPABILITY TO DO A BACK-UP OF DISK ON TAPE

NOTE-17: AGA-3 & NX-19 GAS FLOW MEASUREMENT PACKAGE SHALL BE INCORPORATED FOR GAS FLOW CALCULATIONS.

NOTE-18: TEST PROGRAMS SHALL BE PROVIDED FOR HARDWARE TESTING OF CPU AND OTHER EQUIPMENTS.

NOTE-19: BIDDER SHALL INCLUDE UTILITY FOR DETECTING ALL KINDS OF 'SOFTWARE' VIRUS AND EMULATE THE SAME. THE UTILITY SHALL PROTECT THE I&C SYSTEM FROM ANY SORT OF SOFTWARE ATTACK

1.0 CONTROL SYSTEM DATA SHEET

SL NO	DESCRIPTION	CONFORMITY TO BE TICK MARKED
	GENERAL FEATURES	
1	SYSTEM: DISTRIBUTED, MICROPROCESSOR BASED	
2	FUNCTIONS: REFER NOTE 1	
3	CAPACITY: REFER ENCLOSED I/O LIST IN SECTION C	
	SYSTEM FEATURES	
4	SCANNING RATE OF ANALOG SIGNALS: 250 MILLI SECONDS OR LESS	
5	SCANNING RATE OF DIGITAL SIGNALS: 100 MILLI SECONDS OR LESS	
6	UPDATING RATE OF ANALOGUE PARAMETER DISPLAY IN CRT: 5 SECONDS OR LESS	
7	UPDATING RATE OF DIGITAL PARAMETER DISPLAY IN CRT: 1 SECOND OR LESS	
8	TIME FOR DISPLAY IN CRT SCREEN ON OPERATOR'S REQUEST: 3 SECONDS OR LESS	
9	MEASUREMENT CIRCUIT: INDEPENDENT FOR EACH MEASUREMENT	
10	CAPABILITY TO PERFORM SYSTEM FUNCTIONS IN ABSENCE OF MAN-MACHINE INTERFACE/ COMMUNICATION	
11	CONTROLLER OUTPUT UPDATED ATLEAST EVERY 500 MILLI SECONDS	
12	SYSTEM EXPANDABILITY	
	SYSTEM MONITORING	
13	EACH SUB SYSTEM FAILURE ALARM	
14	ISOLATION FACILITY FOR GROUND DETECTION AT SUB-SYSTEM LEVEL WITHOUT REMOVING ANY HARDWARE (POWER SUPPLY ISOLATION)	
15	ISOLATION FACILITY FOR GROUND DETECTION OF INDIVIDUAL SIGNAL WITHOUT REMOVING FIELD WIRING (ISOLATION OF A SIGNAL AT BOTH THE TERMINALS)	
16	EARTH FAULT ALARM FOR EACH SUB SYSTEM	
17	POWER SUPPLY FAILURE FOR EACH CIRCUIT	
18	MONITORING OF FINAL CONTROL ELEMENT POSITION WITH RESPECT TO IT'S INPUT SIGNAL WITH ALARM AND DISPLAY IN CRT.	

19	INTERNAL FAULT MONITORING WITH ALARM DISPLAY IN CRT AT EACH CARD LEVEL	
20	SPLIT ARCHITECTURE: REFER NOTE 2	
	DESIGN FEATURES OF HARDWARE	
21	INRUSH CURRENT LIMITER TO DRIVING CIRCUITS	
22	PLUG IN TYPE PCB WITH GOLD PLATED CONTACTS (BOTH AT PLUG AND SOCKET)	
23	PCB: EPOXY FIBRE GLASS	
24	PROTECTION: TROPICALISATION	
25	CIRCUITS: SHORT CIRCUIT PROOF AND VOLTAGE SURGE PROOF	
26	RELIABILITY AND AVAILABILITY	
27	PROTECTION AGAINST CONTINUOUS PRESENCE OF POWER SUPPLY OR SIGNAL	
28	LOGIC DEVICES: INTEGRATED CIRCUITS	
29	I/O MODULE LOCATION: SYSTEM CABINET	
30	STATUS INDICATION LED FOR EACH INPUT AND OUTPUT	
31	FILTERS FOR NOISE REJECTION	
32	POWER SUPPLY HEALTH LED IN MODULES	
33	CARD TYPE OR FUNCTION DESIGNATION TO BE INSCRIBED ON EACH CARD	
34	12 BIT A/D CONVERSION WITH ZERO SHIFT MONITORING EVERY SCAN CYCLE	
	ENVIRONMENT	
35	MAXIMUM TEMPARATURE: 50 DEGREE C	
36	RELATIVE HUMIDITY: 95%	
	ANALOGUE SIGNAL CONDITIONING FUNCTIONS	
37	GALVANIC ISOLATION OF INPUT AND OUTPUT SIGNALS WITH OTHER'S SYSTEMS	
38	INPUT FILTERING FOR NOISE LEVEL	
39	AMPLIFICATION OF LOW LEVEL SIGNALS	
40	SIGNAL DISTRIBUTION: REFER NOTE 3	
41	20% OVER RANGE PROTECTION	
	ANALOGUE SIGNAL MONITORING FUNCTIONS	
42	POWER SUPPLY FAILURE DUE TO SHORT CIRCUIT, WIRE BREAK AND VOLTAGE INTERRUPTION	
43	TRANSMITTER MONITORING FOR PARITY, WIRE BREAK, LIVE ZERO AND END LIMIT VALUES	

44	MONITORING OF A/D CONVERSION	
45	CABLE MONITORING FOR OPEN CIRCUIT	
46	FUSE PROTECTION AND FUSE FAILURE DETECTION	
47	COMMUNICATION MONITORING	
48	WIDE DEVIATIONS BETWEEN ADJACENT SCANS	
49	SELF CHECKING FEATURES FOR DETECTING FAULTY OPERATIONS	
	DIGITAL SIGNAL CONDITIONING FUNCTIONS	
50	GALVANIC ISOLATION OF INPUT AND OUTPUT SIGNALS WITH OTHER'S SYSTEMS	
51	INPUT FILTERING FOR NOISE LEVEL	
52	SIGNAL DISTRIBUTION: REFER NOTE 3	
53	POWER SUPPLY TO THE SENSOR CONTACTS	
59	COMMON MODE NOISE REJECTION (ISOLATION)	
	DIGITAL SIGNAL MONITORING FUNCTIONS	
60	CONTACT MONITORING	
61	CONTACT BOUNCE PROTECTION	
62	POWER SUPPLY FAILURE	
63	FUSE PROTECTION AND FUSE FAILURE DETECTION	
64	COMMUNICATION MONITORING	
65	SELF CHECKING FEATURES FOR DETECTING FAULTY OPERATIONS	
66	FIELD CABLE MONITORING	
	PROCESSOR FUNCTIONS AND CAPABILITY	
67	DATA ACQUISITION AND TIME TAGGING OF ALL POINTS	
68	PROVISION OF TIME SYNCHRONIZING	
69	CONVERSION TO ENGINEERING UNITS FOR ALL ANALOGUE POINTS	
70	MATHEMATICAL FUNCTIONS: REFER NOTE 4	
71	LOGIC FUNCTIONS: REFER NOTE 5	
72	CONTROL TECHNIQUE: REFER NOTE 6	
73	HIGH AND LOW LIMIT REASONABILITY CHECK FOR ALL POINTS	
74	GENERATION OF CALCULATED AND BOOLEAN POINTS	
75	PERFORM CONTROL, DATA ACQUISITION AND DIAGNOSTIC FUNCTIONS	
76	MONITORING OF ADC/ DAC PERFORMANCE AND ALARMING	
77	VALIDATION OF ALL PARAMETERS	

78	POINT DESCRIPTION: MINIMUM 24 ALPHA NUMERIC CHARACTERS	
79	DIGITAL FILTERING	
80	CONTACT STATUS INDICATION FOR ALL DIGITAL POINTS	
81	POINT STATUS AND QUALITY	
82	FACILITY TO DELETE/ RETURN OF ANY POINT FORM/ TO SCANNING/ PROCESSING	
83	COMMUNICATION CONTROL AND MONITORING	
84	COMMUNICATION WITH I/O MODULES	
85	PROCESSOR: 32 BIT WITH FLOATING POINT ARITHMETIC CAPABILITY	
86	DISTRIBUTED DATA BASE FOR STORING ALL PROCESS VARIABLE WITH THEIR ATTRIBUTES	
87	VOLATILE MEMORY TO STORE DYNAMIC PLANT DATA, CONTROL PROGRAMMES AND SELF DIAGNOSTIC ROUTINES	
88	NON-VOLATILE MEMORY TO STORE PROGRAMMES, STANDARD SOFTWARE TO PERFORM CONTROL DATA ACQUISITION AND DIAGNOSTIC FUNCTIONS	
	POWER SUPPLIES	
89	INTERNAL POWER PACK: REFER NOTE 7	
90	SEPARATE FUSES, CIRCUITS FOR EACH SUBSYSTEM	
	OPERATION	
91	AUTO/ MANUAL OPERATION OF CONTROL LOOPS FROM CONTROL CRTS	
92	SET POINTS/ AUTO BIAS ADJUSTMENTS FROM CONTROL CRTS	
	MAINTAINABILITY	
93	ALL CARD REPLACEMENTS ON POWER ON CONDITION	
94	ISOLATION FACILITY OF EACH SUBSYSTEM WITHOUT EFFECTING OTHER SYSTEMS	
95	PROGRAMMING DEVICE	
96	PORTABLE LOOP TUNING MODULES: 2 NOS (OPTIONAL)	

	DRAWINGS	
97	DATA SHEETS FOR VARIOUS MODULES: I/O LIST INDICATING GROUPING OF VARIOUS SIGNALS IN EACH MODULE, CONFIGURATION DRAWING, TRANSMISSION SCHEME IDENTIFYING VARIOUS HARDWARES, INDICATING FLOW OF SIGNAL PATH. INTERNAL AND EXTERNAL WIRING DIAGRAMS, POWER SUPPLY SCHEME TO VARIOUS PANELS/ CABINETS AND DISTRIBUTION TO DIFFERENT HARDWARES, LOOP SCHEMATIC INDICATING THE TERMINAL IDENTIFICATION OF SENSORS AND OTHER HARDWARES IN THE SIGNAL PATH INCLUDING POWER SUPPLY TERMINAL NOS, PIN NUMBER AT THE VARIOUS CARD LEVEL, RACK NO, CABINET NO., ETC., FOR OIL'S APPROVAL AND INSTRUCTION MANUAL	

2.0 NOTES:

NOTE 1: THE CONTROL SYSTEM SHALL MEET ALL THE FUNCTIONS LISTED HEREIN AND NEED NOT BE LIMITED TO THE FOLLOWING ALL THE HARDWARES/ SOFTWARES NECESSARY TO MEET THESE FUNCTIONS SHALL BE PROVIDED

i) TO PROCESS THE FIELD SIGNALS/ GENERATED SIGNALS AND DISTRIBUTE THE CURRENT VALUE AND MAGNITUDE OF THE ANALOGUE PARAMETERS AND STATUS OF THE DIGITAL PARAMETERS CONTINUOUSL IN VARIOUS DISPLAY DEVICES LIKE INDICATING LAMPS LOCATED IN PANELS AND IN VARIOUS DISPLAY MODES IN CRT AND TO PRINT IN THE PRINTER PERIPHERALS AS DEMANDED.

ii) TO PERFORM CONTROL FUNCTIONS AS DETAILED IN VARIOUS CONTROL LOOPS.

NOTE 2: ALL THE FUNCTIONAL CARDS INCLUDING POWER SUPPLY CARDS SHALL BE HOUSED IN CABINETS AND SHALL BE PRE-WIRED

NOTE 3: THE SIGNAL DISTRIBUTION OF INPUT SIGNALS TO VARIOUS DEVICES WITHIN THE SYSTEM OR OTHER SYSTEMS LIKE CLOSED LOOP, OPEN LOOP, ANNUNCIATION SYSTEM INCLUDED IN I&C VENDOR'S SCOPE SHALL BE CARRIED OUT AT THE HARDWARE LEVEL USING SOLID STATE FUNCTIONAL CARDS WITHOUT ANY SOFTWARE INVOLVEMENT.

NOTE 4: THE SYSTEM SHALL INCLUDE THE FOLLOWING FUNCTIONAL BLOCKS TO PERFORM VARIOUS MATHEMATICAL OPERATIONS:

SUM OF'N' INPUTS, SQUARE AND SQUARE ROOT, AVERAGE OF 'N' INPUTS, PERIODIC AVERAGE, DIFFERENCE OF TWO INPUTS, MULTIPLICATION, DIVISION, MINIMUM OF 'N' INPUTS, PERIODIC SUMMATION, PERIODIC MAXIMUM, PERIODIC MINIMUM, RATE OF CHANGE, LOGARTHIM, TRIGNOMETRIC, EXPONENTIAL, POLYNOMIAL, MATRIX FUNCTIONS, ABSOLUTE VALUE, INTEGRATION AND DIFFERENTIATION, RELATIONAL OPERATORS LIKE LESS THAN, LESS THAN OR EQUAL TO, GREATER THAN, GREATER THAN OR EQUAL TO, EQUAL TO, NOT EQUAL TO, ANY OTHER FUNCTIONS AS NECESSARY TO MEET THE FUNCTIONAL REQUIREMENTS AND SOFTWARE PROVISION TO ADD MORE ALGORITHMS BY THE PURCHASER.

NOTE 5: THE SYSTEM SHALL PROVIDE FACILITY TO PERFORM VARIOUS BOOLEAN OPERATIONS. THE FOLLOWING MINIMUM FUNCTIONAL BLOCKS SHALL BE INCLUDED. AND/ NAND, OR/ NOR, NOT, EXCLUSIVE OR AND ANY OTHER FUNCTIONS AS NECESSARY.

NOTE 6: THE SYSTEM SHALL INCLUDE THE FOLLOWING CONTROL TECHNIQUE: MULTIVARIABLE, FEED FORWARD, FEED BACK, CASCADE, AUTOTRACKING, RATIO AND BIAS, STATE VARIABLE, PREDICTIVE, DYNAMIC DEAD BAND, PROPORTIONAL, INTEGRAL, DERIVATIVE AND OTHER COMBINATIONS. AUTO INCHING, AUTOMATIC LIMITS, BLOCKS, RUN UPS, RUN DOWN, AUCTIONEERING, OVER RIDES AND ANY OTHER TECHNIQUES AS MAY BE NECESSARY DURING INTERLOCK OPERATIONS.

NOTE 7: THE INTERNAL POWER PACK SHALL BE REDUNDANT AND ACCEPT 230V AC, 50 HZ FEEDER FROM UN-INTERRUPTED POWER SUPPLY (UPS) SYSTEM. THE INTERNAL POWER PACKS GENERATE DIFFERENT VOLTAGES REQUIRED BY THIS SYSTEM AND A BUS WILL BE FORMED FOR EACH OF THESE VOLTAGES WITH DIODE AUCTIONEERING AT THE OUTLET OF THE INTERNAL POWER PACK. EACH POWER PACK SHALL BE RATED FOR 110% OF MAXIMUM REQUIREMENTS. IN CASE, THESE VOLTAGES ARE DERIVED AT THE INDIVIDUAL CARD, INTERNAL POWER PACK IS NOT APPLICABLE. HOWEVER, THE SYSTEM SHALL BE DESIGNED TO ACCEPT SUPPLY FROM TWO FEEDERS.

HARDWARE SPECIFICATIONS FOR OPERATOR/ ENGINEERING/REMOTE STATIONS

Intel i3, 3 GHz processor

1 MB Cache

4 GB RAM

1TB HDD

Dual Ethernet 10/100/1000 NIC

USB(4), Serial, Parallel ports

CDRW/DVDR Combo

Optical Mouse

Floppy drive

Keyboard

21" TFT

Windows XP/7/8 operating system preferred

SL.NO	OPERATOR/ENGINEERING STATIONS	SUPPLIED BY	QUANTITY
1	OPERATOR STATION	SUPPLIER	1
2	OPERATOR CUM ENGINEERING STATION	SUPPLIER	1
3.	REMOTE OS	SUPPLIER	1

SPECIFICATION FOR REMOTE DIAPHRAGM SEALED PRESSURE TRANSMITTERS

GENERAL

Function	:	Transmitter
Case	:	MFR STD
Mounting	:	2 inch stand pipe
Enclosure class	:	Weather Proof(NEMA 4 & IP-65)
Elec. Area classification:		suitable to operate in Zone 1, Zone 2, Gas group IIA & IIB (Division 1, Division 2, Gas group Class I, Group C&D) environment
Intrinsically safe	:	Yes
Lightning protection	:	Required
Accuracy	:	(i) +/- 0.075% of span for Basic Transmitter (ii)+/- 0.2% of span with remote seal
Turndown ratio	:	100 : 1
Response time	:	250 msec or less
Process data	:	Fluid – Natural gas with condensate and formation water S.G - 0.60 to 0.85
Operating Temperature	:	0 to 50^0C
Humidity	:	5 to 95% RH, Non condensing

TRANSMITTER

Type	:	Micro-Processor based, HART compatible
Power supply	:	16 to 48 VDC(24 VDC normal)
Transmitter output	:	4 TO 20MA
Accessing protocol	:	HART
Indicator	:	4 ½ digit LCD display

Element

Service	:	Gauge pressure
Sensing	:	Capacitance/ Piezoresistive or equivalent with remote seal
Material	:	316 SS
Over range protection to	:	150% of full range
Diaphragm seal	:	Wetted parts material - 316 SS Process connection - ½ inch 600 lbs ANSI Flange Capillary material- 316 SS Armour flexible material- 316 SS Capillary length - 5 meters

Accessories:

Mounting bracket for 2 inch pipe
Companion flanges (including process Flange) with nut & bolts
SS tag plate
Flame proof double compression SS cable gland

PREFERRED VENDORS: EMERSON, ABB, HONEYWELL, YAKOGAWA

PROCESS MONITORING SYSTEM SH 2 OF 4

SL NO	TAG NO	OPERATING PRESSURE (Kg/Cm^2)	TRANSMITTER RANGE(Kg/Cm^2)	SERVICE
1	PT-1023	40	0 – 80	PRODUCTION HEADER PRESSURE AT HP MANIFOLD, M-101A
2	PT-1024	40	0 – 80	PRODUCTION HEADER PRESSURE AT HP MANIFOLD, M-101B
3	PT-1025	40	0 – 80	PRODUCTION HEADER PRESSURE AT HP MANIFOLD, M-101C
4	PT-1026	40	0 – 80	PRODUCTION HEADER PRESSURE AT HP MANIFOLD, M-101D
5	PT-1027	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:1 AT HP MANIFOLD, M-101A
6	PT-1028	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:2 AT HP MANIFOLD, M-101A
7	PT-1029	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:3 AT HP MANIFOLD, M-101A
8	PT-1030	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:4 AT HP MANIFOLD, M-101A
9	PT-1031	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:5 AT HP MANIFOLD, M-101A
10	PT-1032	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:6 AT HP MANIFOLD, M-101A
11	PT-1033	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:7 AT HP MANIFOLD, M-101A
12	PT-1034	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:8 AT HP MANIFOLD, M-101A
13	PT-1035	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:9 AT HP MANIFOLD, M-101A
14	PT-1036	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:10 AT HP MANIFOLD, M-101A
15	PT-1037	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:1 AT HP MANIFOLD, M-101B
16	PT-1038	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:2 AT HP MANIFOLD, M-101B
17	PT-1039	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:3 AT HP MANIFOLD, M-101B
18	PT-1040	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:4 AT HP MANIFOLD, M-101B
19	PT-1041	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:1 AT HP MANIFOLD, M-101C
20	PT-1042	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:2 AT HP MANIFOLD, M-101C
21	PT-1043	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:3 AT HP MANIFOLD, M-101C
22	PT-1044	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:4 AT HP MANIFOLD, M-101C
23	PT-1045	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:5 AT HP MANIFOLD, M-101C
24	PT-1046	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:6 AT HP MANIFOLD, M-101C
25	PT-1047	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:7 AT HP MANIFOLD, M-101C
26	PT-1048	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:8 AT HP MANIFOLD, M-101C
27	PT-1049	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:9 AT HP MANIFOLD, M-101C
28	PT-1050	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:10 AT HP MANIFOLD, M-101C
29	PT-1051	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:1 AT HP MANIFOLD, M-101D
30	PT-1052	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:2

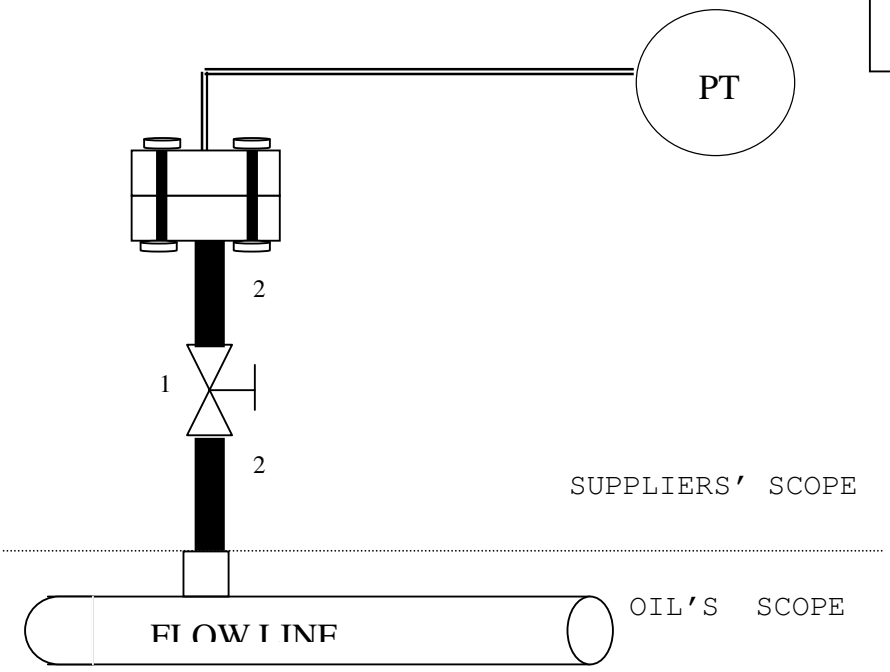
				AT HP MANIFOLD, M-101D
PROCESS MONITORING SYSTEM				SECTION D4 **SH 3 OF 4**
31	PT-1053	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:3 AT HP MANIFOLD, M-101D
32	PT-1054	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:4 AT HP MANIFOLD, M-101D
33	PT-1055	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:5 AT HP MANIFOLD, M-101D
34	PT-1056	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:6 AT HP MANIFOLD, M-101D
35	PT-1057	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:7 AT HP MANIFOLD, M-101D
36	PT-1058	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:8 AT HP MANIFOLD, M-101D
37	PT-1059	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:9 AT HP MANIFOLD, M-101D
38	PT-1060	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:10 AT HP MANIFOLD, M-101D
39	PT-1061	40	0 – 80	PRODUCTION HEADER PRESSURE AT LP MANIFOLD, M-102A
40	PT-1062	40	0 – 80	PRODUCTION HEADER PRESSURE AT LP MANIFOLD, M-102B
41	PT-1063	40	0 – 80	PRODUCTION HEADER PRESSURE AT LP MANIFOLD, M-102C
42	PT-1064	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:1 AT LP MANIFOLD, M-102A
43	PT-1065	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:2 AT LP MANIFOLD, M-102A
44	PT-1066	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:3 AT LP MANIFOLD, M-102A
45	PT-1067	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:1 AT HP MANIFOLD, M-102B
46	PT-1068	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:2 AT HP MANIFOLD, M-102B
47	PT-1069	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:3 AT HP MANIFOLD, M-102B
48	PT-1070	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:1 AT HP MANIFOLD, M-102C
49	PT-1071	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:2 AT HP MANIFOLD, M-102C
50	PT-1072	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:3 AT HP MANIFOLD, M-102BC
51	PT-1073	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:4 AT HP MANIFOLD, M-102C
52	PT-1074	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:5 AT HP MANIFOLD, M-102C
53	PT-1075	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:6 AT HP MANIFOLD, M-102C
54	PT-1076	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:7 AT HP MANIFOLD, M-102C
55	PT-1077	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:8 AT HP MANIFOLD, M-102C
56	PT-1078	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:9 AT HP MANIFOLD, M-102C
57	PT-1079	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:10 AT HP MANIFOLD, M-102C
58	PT-1080	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:12 AT LP MANIFOLD, M-102C
59	PT-1081	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:13 AT LP MANIFOLD, M-102C
60	PT-1082	40	0 – 80	FLOW LINE PRESSURE OF WELL NO:14 AT LP MANIFOLD, M-102C
61	PT-2102	60	0-100	SUCTION PRESSURE OF P-104
62	PT-2103	60	0-100	DISCH PRESSURE OF P-104
63	PT-2104	60	0-100	SUCTION PRESSURE OF P-105
64	PT-2105	60	0-100	DISCH PRESSURE OF P-105

PROCESS MONITORING SYSTEM **SH 4 OF 4**

TYPICAL INSTALLATION DIAGRAM OF REMOTE SEAL TYPE PRESSURE TRANSMITTER

APPLICABLE TAG NO:

1) **PT-1023 to PT-1082 = 60nos.**
2) **PT-2102, 2103, 2104, 2105 = 4nos.**



BILL OF MATERIALS

SL NO	DESCRIPTION	QTY/ UNIT	TOTAL QTY	SIZE	MATERIAL	PRESSURE RATING IN KG/CM2
1	BALL VALVE (THREAD TYPE)	1	64	1/2″ NPT(F)	SS316	100
2	NIPPLE	2	128	½″ X 6″	SS316	100

NOTE:

PT SHALL BE MOUNTED ON 2" STAND PIPE

INSTALLATION SKETCH

SPECIFICATION FOR PRESSURE TRANSMITTERS

GENERAL

Function	:	Transmitter
Case	:	MFR STD
Mounting	:	2 inch stand pipe
Enclosure class	:	Weather Proof (NEMA 4 & IP-65)
Elec. Area classification:		suitable to operate in Zone 1, Zone 2, Gas group IIA & IIB (Division 1, Division 2, Gas group Class I, Group C&D) environment
Intrinsically safe	:	Yes
Lightning protection	:	Required
Accuracy	:	+/- 0.075% of span
Turndown ratio	:	100 : 1
Response time	:	250 msec or less
Process data	:	Fluid – Natural gas with condensate and formation water S.G - 0.60 to 0.85
Operating Temperature	:	0 to 50^0C
Humidity	:	5 to 95% RH, Non condensing

TRANSMITTER

Type	:	Micro-Processor based, HART compatible
Power supply	:	16 to 48 VDC(24 VDC normal)
Transmitter output	:	4 TO 20MA
Accessing protocol	:	HART
Indicator	:	4 ½ digit LCD display

Element

Service	:	Gauge pressure
Sensing	:	Capacitance/ Piezoresistive or equivalent
Material	:	316 SS
Over range protection to	:	150% of full range
Process connection	:	½ inch NPT (F)

Accessories:

Mounting bracket for 2 inch pipe
SS Tag plate to be provided
Flame proof double compression SS cable gland

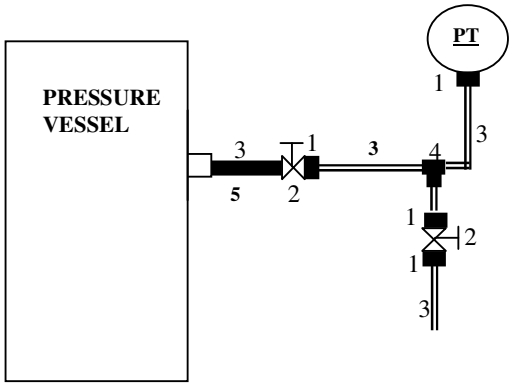
PREFERRED VENDORS: EMERSON, ABB, HONEYWELL, YAKOGAWA

SL NO	TAG NO	OPERATING PRESSURE (Kg/Cm^2)	TRANSMITTER RANGE	SERVICE
1	PT-1203	25	0 – 50	PRESSURE OF GROUP UNIT-I, V-117
2	PT-1204	25	0 – 50	PRESSURE OF GROUP UNIT-I, V-118
3	PT-1303	7	0 - 30	PRESSURE OF GROUP UNIT-II, V-119
4	PT-1304	7	0 – 30	PRESSURE OF GROUP UNIT-II, V-120
5	PT-1403	3.5	0 – 15	PRESSURE OF EMULSION TREATER, V-121
6	PT-1404	3.5	0 – 15	PRESSURE OF EMULSION TREATER, V-122

TYPICAL INSTALLATION DIAGRAM OF PRESSURE TRANSMITTER

APPLICABLE TAG NO

PT-1203
PT-1204
PT-1205
PT-1206
PT-1403
PT-1404



BILL OF MATERIALS:

ITEM NO	DESCRIPTION	QTY/ UNIT	TOTAL QTY.	SIZE	MATERIAL	PRESSURE RATING IN KG/CM2
1	MALE CONNECTOR	4 NOS	24 NOS	½″NPT (M)	SS316	100
2	NIDDLE VALVE	2 NOS	12 NOS	½″ NPT (F)	SS316	100
3	TUBE	3 MTRS.	18 MTRS	1/2″ OD	SS316	100
4	UNION TEE	1 NO	6 NOS	1/2″ NPT	SS316	100
5	NIPPLE	1	6 NOS	½″ X 6″	SS316	100

NOTES

1. ALL FITTINGS SHALL BE OF DOUBLE COMPRESSION TYPE
2. PT SHALL BE MOUNTED ON 2″ STAND PIPE

INSTALLATION SKETCH NO: 2

SPECIFICATION FOR TEMPERATURE TRANSMITTERS WITH RTD

TRANSMITTER:

Type	:	Micro-Processor based, HART compatible
Input	:	RTD Pt-100 (3-wire)
Output	:	4 TO 20MA
Accessing protocol	:	HART
Power supply	:	16 to 48 VDC(24 VDC normal)
Minimum load capability	:	600 ohms at 24 VDC
Area classification	:	Division1&2, Class1, Group C&D
Housing	:	Weather proof to NEMA4 & IP-65
Design	:	Intrinsically safe
Accuracy	:	+/- 0.075%
Response time	:	250 msecs or less
Cable entry	:	½ inch NPT
Mounting	:	2-inch stand pipe
Integral Output Indicator:		4½ digit LCD display
Lightning protection :		to be provided
Operating Temperature	:	0 to 50^0C
Humidity	:	5 to 95% RH, Non condensing

RTD with THERMOWELL:

ELEMENT:

No.of elements	:	Duplex
Calibration	:	As per DIN 43760
Element material	:	platinum
Resistance at 0^0C	:	100 ohms
Leads	:	standard
Sheath O.D	:	6 mm
Sheath material	:	316 SS
Nipple & Union material	:	Chrome plated steel
Union	:	Required
Connection	:	Three wire

HEAD:

Head cover	:	Screwed cap with cover
Material	:	Cast Aluminium
Conduit connection	:	¾ inch ET
Enclosure	:	Weather proof to NEMA4 &IP-65
Cable gland	:	Required

THERMOWELL:

Material	:	316 SS
Construction	:	Drilled bar stock

ACCESSORIES:

Mounting bracket for 2-inch pipe

SS tag plate

Flame proof double compression SS cable gland (3 nos each)

PREFERRED VENDORS: EMERSON, ABB, HONEYWELL, YAKOGAWA

TAG NO	OPERATING TEMPERATURE (^{0}C)	TRANSMITTER RANGE (^{0}C)	THERMOWELL	SERVICE
TT-1104	60	0 – 100	Suitable for 8-inch line size. Process connection: ½ inch NPT(M) Internal connection : ½ inch NPT(F)	Temperature of inlet Crude Oil of INDIRECT HEATER IH-104
TT-1105	60	0 – 100	Suitable for 8-inch line size. Process connection: ½ inch NPT(M) Internal connection : ½ inch NPT(F)	Temperature of inlet Crude Oil of INDIRECT HEATER IH-105
TT-1106	60	0 – 100	Process connection : 1 inch NPT(M) Internal connection : ½ inch NPT(F) Immersion length : 08 inch	CRUDE OIL BATH TEMP. OF INDIRECT HEATER, IH-104
TT-1107	60	0-100	Process connection : 1 inch NPT(M) Internal connection : ½ inch NPT(F) Immersion length : 08 inch	CRUDE OIL BATH TEMP. OF INDIRECT HEATER, IH-105
TT-1108	60	0-100	Suitable for 8-inch line size. Process connection: ½ inch NPT(M) Internal connection : ½ inch NPT(F)	CRUDE OIL OUTLET TEMP. OF INDIRECT HEATER, IH-104
TT-1109	60	0-100	Suitable for 8-inch line size. Process connection: ½ inch NPT(M) Internal connection : ½ inch NPT(F)	CRUDE OIL OUTLET TEMP. OF INDIRECT HEATER, IH-105
TT-1405	60	0-100	Process connection : 1 inch NPT(M) Internal connection : ½ inch NPT(F) Immersion length : 12 inch	TEMPERATURE OF EMULSION TREATER, V-123
TT-1406	60	0 – 100	Process connection : 1 inch NPT(M) Internal connection : ½ inch NPT(F) Immersion length : 12 inch	TEMPERATURE OF EMULSION TREATER, V-124

SECTION D6 **PROCESS MONITORING SYSTEM** **SH 3 OF 3**				
TT-1408	60	0-100	Suitable for 8-inch line size. Process connection: ½ inch NPT(M) Internal connection : ½ inch NPT(F)	CRUDE OUTLET TEMPERATURE OF EMULSION TREATER, V-123
TT-1409	60	0-100	Suitable for 8-inch line size. Process connection: ½ inch NPT(M) Internal connection : ½ inch NPT(F)	CRUDE OUTLET TEMPERATURE OF EMULSION TREATER, V-124

SPECIFICATION FOR FLAME SENSOR
(THERMOCOUPLE WITH TEMPERATURE CONTROLLER)

Burner	:	Natural Gas fired
Monitoring	:	of PILOT FLAME

THERMOCOUPLE

Type	:	K (CROMEL / ALUMEL), ungrounded junction
Operating Temperature	:	800 – 1000^{0}C
No. of pairs	:	Double
Protection	:	SS sheathed (flexible)
Length	:	7 feet (min)
Installation	:	i) The Thermocouple shall be housed in the Thermowell welded on the pilot burner ii) The Thermocouple shall be connected with the Temperature Controller through SS sheathed compensating cable.

TEMPERATURE CONTROLLER

Range	:	0 – 1200 deg. C
Input	:	'K' type thermocouple
Control action	:	ON/OFF
Set point adjustment	:	throughout the range
Output relay contacts	:	2 sets
Operating Voltage	:	24V DC
Area classification	:	Class 1, Division 2 Group C&D

ACCESSORIES:
Flame proof Cable glands required

SL NO	INSTRUMENT	TYPE	SERVICE
1	FS-1104	THERMO-COUPLE SENSOR WITH TEMPERATURE CONTROLLER FOR FLAME SENSING	INDIRECT HEATER IH-104
2	FS-1105	-DO-	INDIRECT HEATER, IH-105
3	FS-1405	-DO-	EMULSION TREATER, BURNER 1, V-121
4	FS-1408	-DO-	EMULSION TREATER, BURNER 2, V-121
5	FS-1406	-DO-	EMULSION TREATER, BURNER 1, V-122
6	FS-1409	-DO-	EMULSION TREATER, BURNER 2, V-122

SECTION D8

PROCESS MONITORING SYSTEM **SH 1 OF 1**

SPECIFICATION FOR RADAR TANK GAUGE

Type	:	Micro-Processor based, HART compatible
Operating principle	:	10 GHz and above, FMCW (Frequency Modulated Continuous Wave) – RADAR
Microwave output power	:	Max. 1.0 mW
Antenna	:	Horn/Cone
Antenna size	:	Suitable for measuring range
Material exposed to Tank atmosphere	:	Antenna – SS 316L Sealing – PTFE "O" ring – Viton
Mounting	:	On the existing manhole cover
Ingress protection	:	IP66, NEMA 4
Ex-certificate	:	DGMS (Director General of Mines safety) certification for use in Zone 1, Zone 2, Gas group IIA & IIB (Division 1, Division 2, Gas group Class I, Group C&D) environment
Instrument accuracy	:	± 1 mm
Repeatability	:	1 mm
Power supply	:	24V DC
Output	:	HART, 4 TO 20MA
Accessing protocol	:	HART
Cable entries	:	½" NPT
Display	:	Graphic LCD display Protection class IP67

Display mounting : To be mounted at the bottom of the Tank

Environment : Ambient temperature 0 – 50^{0}C
Tank temperature 0 – 50^{0}C
Pressure – Atmospheric
Humidity – 95% RH,

Lightning protection : To be provided

Accessories : 1. Flame proof cable gland
2. Mounting bracket to mount the Display unit on 2" pipe at Tank bottom

SL.NO	TAG NO	Range (Meters)	SERVICE
1	LT-2301	0-5	TEST TANK T-107

PREFERRED VENDORS: SAAB, ENRAF, ROSEMOUNT, ENDRESS-HAUSE

SECTION D09

PROCESS MONITORING SYSTEM SH 1 OF 1

SPECIFICATION FOR LEVEL & INTERFACE TRANSMITTER

Type : Guided Wave RADAR Level and Interface Transmitter

Application : Level measurement of Crude oil and Interface level measurement between Crude oil and water in Pressurized vessel which also contains Natural Gas.

Signal output : 4-20 ma with HART communication

Electrical class : suitable to operate in Zone1, Zone2, Gas group IIA & IIB (Division 1, Division 2, Gas group Class I, Group C&D) environment

Power supply : 24 V DC

Design : Intrinsically safe

Enclosure : NEMA IV & IP-65

Accessories : i) Transmitter to be supplied with counter flanges and required nuts and bolts
ii) Flame proof Cable glands required

Conduit/ Cable threads: ½ inch NPT

Lightning protection: to be provided

Operating Temperature: 0 to 50^{0}C

Humidity : 100% RH

Material of Construction (Process connection/ Probe): 316L SST

NOTE : The fluid occasionally overflows

and comes in to contact with the sensor. So, the sensor to be suitable to withstand contamination with process fluid.

TAG NO	MAXIMUM PRESSURE (Kg/Cm^2)	TRANSMITTER RANGE (Meters)	PROCESS CONNECTION	SERVICE
LT-1406	10	0 – 3	3 INCH FLANGE ANSI 150 CLASS	INT. LEVEL OF EMULSION TREATER, V-121
LT-1409	10	0 – 3	3 INCH FLANGE ANSI 150 CLASS	INT. LEVEL OF EMULSION TREATER, V-121
LT-1407	10	0 – 3	3 INCH FLANGE ANSI 150 CLASS	INT. LEVEL OF EMULSION TREATER, V-122
LT-1410	10	0 – 3	3 INCH FLANGE ANSI 150 CLASS	INT. LEVEL OF EMULSION TREATER, V-122

PROCESS MONITORING SYSTEM SH 1 OF 3

SPECIFICATION FOR LEVEL TRANSMITTER

Type : Guided Wave RADAR Level Transmitter

Application : Level measurement of Crude oil in Pressurized vessel, which also contains Natural Gas.

Signal output : 4-20 ma with HART communication

Electrical class : suitable to operate in Zone1, Zone2, Gas group IIA & IIB (Division 1, Division 2, Gas group Class I, Group C&D) environment

Power supply : 24 V DC

Design : Intrinsically safe

Enclosure : NEMA IV & IP-65

Accessories : i) Transmitter to be supplied with counter flanges and required nuts and bolts
ii) Flame proof Cable glands required

Conduit/ Cable threads: ½ inch NPT

Lightning protection: to be provided

Operating Temperature: 0 to 50^0C

Humidity : 100% RH

Material of Construction (Process connection/ Probe): 316L SST

NOTE : The fluid occasionally overflows and comes in to contact with the sensor. So, the sensor to be suitable to withstand contamination with process fluid.

NOTE :The sensor shall be mounted in a external cage if there is any obstruction to mount from the top of the vessel. In such cases the supplier has to provide an integral unit containing both the cage with sight glass and cage with guided wave RADAR sensor.

TAG NO	MAXIMUM PRESSURE (Kg/Cm^2)	TRANSMITTER RANGE (Meters)	PROCESS CONNECTION	SERVICE
LT-1203	37.5	0 – 2	3 INCH FLANGE ANSI 600 CLASS	GROUP UNIT I(3), (V-117)
LT-1204	37.5	0 – 2	3 INCH FLANGE ANSI 600 CLASS	GROUP UNIT I(4) (v-118)
PROCESS MONITORING SYSTEM				SECTION D10 **SH 2 OF 3**
LT-1303	15	0 - 2	3 INCH FLANGE ANSI 300 CLASS	GROUP UNIT II(3) (v-119)
LT-1304	15	0 – 2	3 INCH FLANGE ANSI 300 CLASS	GROUP UNIT II(4) (v-120)
LT-1403	5 to 10	0 – 1	3 INCH FLANGE ANSI 150 CLASS and EXTERNAL CAGE WITH SIGHT GLASS	LEVEL OF EMULSION TREATER, V-121
LT-1404	5 to 10	0 – 1	3 INCH FLANGE ANSI 150 CLASS and EXTERNAL CAGE WITH SIGHT GLASS	LEVEL OF EMULSION TREATER, V-122
LT-1603	37.5	0 – 1	3 INCH FLANGE ANSI 150 CLASS & VALVE TO VALVE DISTANCE IS 51CM and EXTERNAL CAGE WITH SIGHT GLASS	LEVEL OF TEST UNIT-I, V-109
LT-1604	10	0 – 1	3 INCH FLANGE ANSI 150 CLASS & FLANGE TO FLANGE DISTANCE IS 46CM and EXTERNAL CAGE WITH SIGHT GLASS	LEVEL OF TEST UNIT-I, V-110
LT-2201	37.5	0 – 1	3 INCH FLANGE ANSI 150 CLASS & FLANGE TO FLANGE DISTANCE IS 66CM and EXTERNAL CAGE WITH SIGHT GLASS	LEVEL OF HPMS-I, V-111
LT-2202	37.5	0 – 1	3 INCH FLANGE ANSI 150 CLASS &	LEVEL OF HPMS-2, V-112

			FLANGE TO FLANGE DISTANCE IS 66CM and EXTERNAL CAGE WITH SIGHT GLASS	
LT-2301	6.5	0 – 1	3 INCH FLANGE ANSI 150 CLASS & FLANGE TO FLANGE DISTANCE IS 45CM and EXTERNAL CAGE WITH SIGHT GLASS	LEVEL OF LPMS-1, V-113
PROCESS MONITORING SYSTEM				SECTION D10 **SH 3 OF 3**
LT-2302	6.5	0 – 1	3 INCH FLANGE ANSI 150 CLASS & FLANGE TO FLANGE DISTANCE IS 45CM and EXTERNAL CAGE WITH SIGHT GLASS	LEVEL OF LPMS-2, V-114
LT-2401	15	0 – 1	3 INCH FLANGE ANSI 150 CLASS & FLANGE TO FLANGE DISTANCE IS 50CM and EXTERNAL CAGE WITH SIGHT GLASS	LEVEL OF SERVO SCRUBBER, V-116
LT-2501	6.5	0 – 1	3 INCH FLANGE ANSI 150 CLASS & FLANGE TO FLANGE DISTANCE IS 45CM and EXTERNAL CAGE WITH SIGHT GLASS	LEVEL OF VLPMS, V-115

PROCESS MONITORING SYSTEM SH 1 OF 2

HIGH PRECISION WATER-IN-OIL MONITOR (AT CRUDE OIL DESPATCH PUMP OUTLET)& ET outlet

The Water-in –oil Monitor shall be installed at the outlet of Crude oil dispatch pump of the OIL COLLECTING STATION & Emulsion treater outlet for continuous monitoring of the quality of dispatched crude oil and treated emulsion at ET outlet.

General:

Measurement principle : Admittance or equivalent
Type : High precision, Non-intrusive
Range : 0-5%

Process Specifications:

- Line Size : 200mm (8 inch)
- Average Flow rate : 60 KL/Hr
- Maximum instantaneous flow rate : 140 KL/Hr
- Water content : 0 – 5%
- Alarm set at : 0.8%
- Salinity : 1000 – 4000 ppm
- API Gravity range of crude oil : 15 – 40
- Normal Specific gravity of water : 1.02
- Normal Specific gravity of oil : 0.85
- Small amount gas in solution will be present in the oil/water mixture line. **The vendor should specify the maximum allowable free gas/ gas in solution through their instrument and also indicate it's effect on accuracy of measurement.**
- CODP outlet pressure : Operating : 20 Kg/cm^2
  Maximum : 70 Kg/cm^2

ET OUTLET PRESSURE : MAXIMUM: 10 Kg/cm^2

- Operating Temperature range : $10^0C – 60^0C$
- End connection size : 8 inch NB, RTJ, Flanged
- Pressure rating : ANSI 600 class
- Maximum distance between the Sensor and the Operator's room : 200 mtrs
- The equipment should be complete with the required SS pipe length(if any), companion flange, stud bolts and nuts. Companion flanges should be screwed to API line pipe threads.
- The water-in-oil monitor system shall consist of a transducer and computing unit.

TRANSDUCER:

- Design : to be tolerant to sand, grit and gas in solution
- Line size : 200mm (8 inch)
- Accuracy : 0.1% absolute
- Repeatability : 0.75% of reading
- Outputs : 4 – 20 ma or Frequency Signal

PROCESS MONITORING SYSTEM

- Compensation for : Temperature and salinity effects
- Temperature measurement range : 0 – 200^{0}C
- Process wetted parts : 316SS/ 304L SS
- Intrinsically safe
- Hazardous area classification : Class I, Div I, Group C&D
- Power supply : 24V DC
- Lightning protection : to be provided
- Operating Temperature : 0 to 50^{0}C
- Humidity : 100% RH

COMPUTER UNIT:

- The computer unit should be able to display continuously the water percentage of the emulsion stream. It should be able to give alarm whenever the water percentage exceeds the set point of 0.8% water.
- Display : Reflective Alphanumeric LCD
- System Measurement Uncertainty (Accuracy) : 0.1% absolute
- Outputs : i) 4–20ma output signal proportional to 0-5% of water cut.
  ii) Relay contact for alarm/ annunciation. The set point to energize the output relay should be adjustable within 0-5% of water cut range.
  iii) Interface with necessary software to connect with DCS/ RTU.
- Ambient temperature range : 0 - 60^{0}C
- Enclosure : NEMA IV standard
- Power supply : 24 VDC

ACCESSORIES

Flame proof cable glands required

SL NO	TAG NO	FUNCTION	LOCATION

1	WIOM-2116	TO MEASURE WATER PERCENTAGE CONTINUOUSLY AT THE CODP OUTLET	CODP OUTLET, X-101
2	WIOM-1403	WATER PERCENTAGE AT EMULSION TREATER CRUDE OIL OUTLET,V-121	ET OUTLET, V-121
3	WIOM-1404	WATER PERCENTAGE AT EMULSION TREATER CRUDE OIL OUTLET,V-122	ET OUTLET, V-122

SPECIFICATION FOR I/P CONVERTER

Type	:	Electro-pneumatic signal Transducer designed for intrinsic safe applications.
Input signal	:	4 to 20 mA DC
Output signal	:	3 to 15 psi (0.2 to 1.0 bar)
Action	:	Field reversible between direct And reverse action.
Supply	:	Natural Gas
Supply pressure	:	Normal – 20 psig Maximum – 50 psig (3.5 bar)
Maximum supply Gas demand	:	480 scfh (13.4 m^3/Hr) at 20 psig (1.4 bar) supply pressure
Accuracy	:	+/- 0.75% of Output signal span
Linearity	:	± 0.2% of full span
Repeatability	:	0.1% of full span
Hysteresis	:	0.2% of full span
Air consumption	:	0.32 Nm^3/Hr or less

Elec. Area classification: suitable to operate in Zone1, Zone2, Gas group IIA & IIB (Division 1, Division 2, Gas group Class I, Group C&D) environment

Housing	:	Weather proof (NEMA IV & IP-65)
Adjustments	:	Zero and Span adjustments
Connections	:	Supply Pressure – ¼ inch NPT(F) Output Pressure – ¼ inch NPT(F) Vent – ¼ inch NPT(F) with screen Electrical – ½ inch NPT(F)

Lightning protection: to be provided

Operating Temperature: 0 to 50^0C
Humidity : 100% RH

ACCESSORIES

Flame proof cable glands required

PREFERRED VENDORS: ROSEMOUNT, ABB, HONEYWELL, YAKOGAWA, FISHER

PROCESS MONITORING SYSTEM SH 2 OF 2

SL NO	SENSOR	SUPPLIED BY	FUNCTION	LOCATION
1	IP-1203	VENDOR	CONTROL ACTION ON CONTROL VALVE PCV-1203	GROUP UNIT I V-117
2	IP-1204	VENDOR	CONTROL ACTION ON CONTROL VALVE PCV-1204	GROUP UNIT I V-118
3	IP-1203	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1203	GROUP UNIT I V-117
4	IP-1204	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1204	GROUP UNIT I V-118
5	IP-1303	VENDOR	CONTROL ACTION ON CONTROL VALVE PCV-1303	GROUP UNITII V-119
6	IP-1304	VENDOR	CONTROL ACTION ON CONTROL VALVE PCV-1304	GROUP UNITII V-120
7	IP-1303	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1303	GROUP UNITII V-119
8	IP-1304	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1304	GROUP UNITII V-120
9	IP-1403	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1403	EMULSION TREATER, V-121
10	IP-1403	VENDOR	CONTROL ACTION ON CONTROL VALVE PCV-1403	EMULSION TREATER, V-121
11	IP-1405	VENDOR	CONTROL ACTION ON CONTROL VALVE TCV-1405	EMULSION TREATER, V-121
12	IP-1406	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1406	EMULSION TREATER, V-121
13	IP-1409	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1409	EMULSION TREATER, V-121
14	IP-1404	VENDOR	CONTROL ACTION ON CONTROL VALVE PCV-1404	EMULSION TREATER, V-122
15	IP-1404	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1404	EMULSION TREATER, V-122
16	IP-1406	VENDOR	CONTROL ACTION ON CONTROL VALVE TCV-1406	EMULSION TREATER, V-122
17	IP-1407	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1407	EMULSION TREATER, V-122
18	IP-1410	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1410	EMULSION TREATER, V-122
19	IP-1603	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1603	TEST UNIT-I V-109
20	IP-1604	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1604	TEST UNIT-I V-110
21	IP-2201	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-2201	HPMS V-112
22	IP-2202	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-2202	HPMS V-112
23	IP-2301	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1801	LPMS V-114

24	IP-2302	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-1802	LPMS V-114
25	IP-2501	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-2501	LPMS V-115
26	IP-2401	VENDOR	CONTROL ACTION ON CONTROL VALVE LCV-2401	SERVO TANK V-116

SPECIFICATION FOR PRESSURE SWITCHES

GENERAL

Type	:	Direct
Mounting	:	Yoke
Case Material	:	Cast Aluminium
Enclosure	:	Weather proof (NEMA IV & IP-65)
Range	:	0-80 Kg/Cm^2

SWITCH

Output electric contact	:	yes
Quantity	:	Two
Form	:	SPDT
Type	:	SNAP ACT MICROSWITCH
Contact plating	:	Gold plated
Rating	:	5 A, 230V AC
Load type	:	Resistive
Cable entry	:	½ inch NPT(F)
Set point adjustment	:	Internal with indicating Scale
Differential	:	Fixed

MEASUREMENT UNIT

Element type	:	Vendor STD.
Element material	:	316 SS
Process connection	:	½ inch NPT(M), Bottom
Over range protection	:	30% of range
Mounting accessories	:	Suitable for 2" NB pipe
Cable gland	:	½" NPT
Terminal block	:	2-Way type suitable for $2.5mm^2$ cable

ACCESSORIES

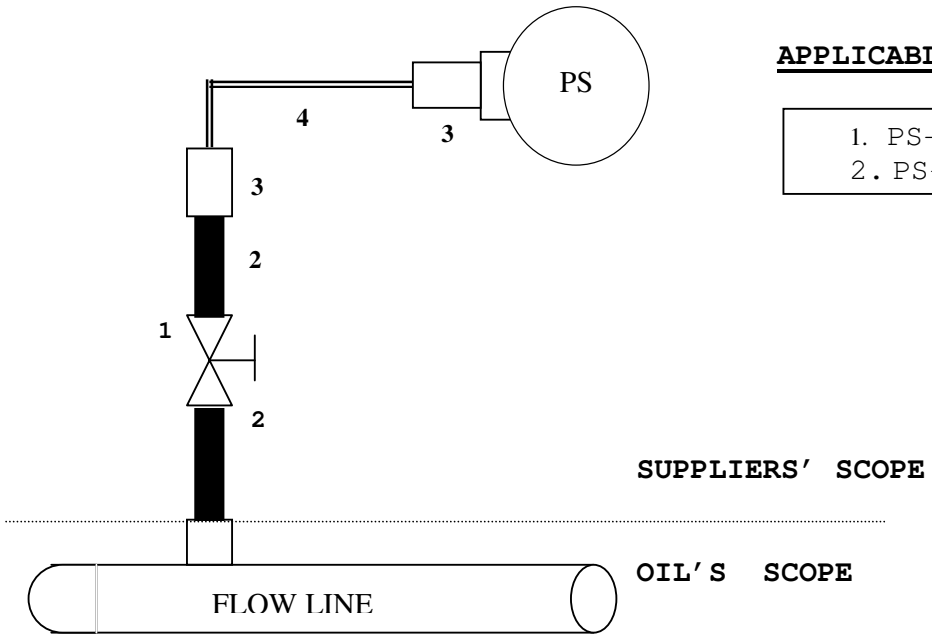
Flame proof cable glands required

SL NO	SENSOR	SUPPLIED BY	FUNCTION	LOCATION	SET POINT
1	PS-2104	VENDOR	CRUDE OIL DESPATCH PUMP STATUS INDICATION	CODP P-101	10 Kg/Cm^2

2	PS-2105	VENDOR	CRUDE OIL DESPATCH PUMP STATUS INDICATION	CODP P-102	10 Kg/Cm^2

PROCESS MONITORING SYSTEM SH 2 OF 2

TYPICAL INSTALLATION DIAGRAM OF PRESSURE SWITCH



APPLICABLE TAG NOS

1. PS-2104
2. PS-2105

BILL OF MATERIALS

SL NO	DESCRIPTION	QTY/ UNIT	TOTAL QTY	SIZE	MATERIAL	PRESSURE RATING IN KG/CM2
1	BALL VALVE (THREAD TYPE)	1	2	1/2" NPT(F)	SS316	100
2	NIPPLE	2	4	½" X 4"	SS316	100
3	FEMALE CONNECTOR	2	4	1/2" NPT(F)x ½" OD	SS316	100
4	TUBE	3 MTRS	6 MTRS	½" OD	SS316	100

NOTES:
1. PT SHALL BE MOUNTED ON 2" STAND PIPE
2. ALL FITTINGS SHALL BE OF DOUBLE COMPRESSION TYPE

INSTALLATION SKETCH

SECTION D14

PROCESS MONITORING SYSTEM **SH 1 OF 2**

SPECIFICATION FOR CONTROL CABLE

CONDUCTOR:		
Material	:	Tinned copper
Cross-sectional area of each core	:	1.5 mm^2
No.of strands in each core	:	7 (seven)
Diameter of each strand	:	0.5 mm
Core colour	:	Black
Core identification	:	White numbering on each core with 50 mm gap between two numbers
INSULATION:		
Material	:	Flame retardant PVC
Thickness	:	0.64 mm (Nominal)
Continuous temperature rating	:	85^0C
Voltage grade	:	1100 V
Insulation resistance (Min)	:	100 Mega Ohms/ Km at 20^0C
ARMOURING:		
Material	:	Galvanized steel
Magnetic/Non Magnetic	:	Magnetic
Round wire/ Flat strip	:	Round wire
SHIELDING:		
Material	:	Mylar backed Aluminium foil
Thickness	:	0.0635 mm (63 Micron)
Drain wire (for shield continuity)	:	Required
Material of Drain wire	:	Tinned copper
Shielding of individual cores	:	Not required
Overall shielding	:	Aluminium Mylar screen
OUTER SHEATH:		
Material	:	Flame retardant PVC
Thickness (Min.)	:	2.03 mm
Colour	:	Black

PREFERRED VENDORS: KEI, THERMOPADS, DELTON CABLES, FINOLEX

PROCESS MONITORING SYSTEM

Note: Tentative cable requirement for estimation only. Bidder is requested to visit site for exact estimation before submitting the bid. **A tentative cable schedule is attached for reference only.**

SL NO	CABLE	SUPPLIED BY	LOCATION	LENGTH IN MTRS
1	24-core	SUPPLIER	Control room to JB1 for Manifold	100
2	24-core	SUPPLIER	Control room to JB2 for Manifold	100
3	24-core	SUPPLIER	Control room to JB3 for Indirect Heaters	100
4	24-core	SUPPLIER	Control room to JB4 for Emulsion Treater 1	200
5	24-core	SUPPLIER	Control room to JB5 for Emulsion Treater 2	200
6	24-core	SUPPLIER	Control room to JB6 in Process area for Group Units and Test Units	125
7	24-core	SUPPLIER	Control room to JB7 in Process area for Group Units and Test Units	125
8	24-core	SUPPLIER	Control room to JB8 in Process area for Stabilizer Units	100
9	24-core	SUPPLIER	Control room to JB9 in Process area (Metering area)	125
10	24-core	SUPPLIER	Control room to JB10 in Process area (Metering area)	125
11	24-core	SUPPLIER	Control room to JB11 in Process area(Metering area)	125
12	24-core	SUPPLIER	Control room to JB12 in Process area (Metering area)	125
13	24-core	SUPPLIER	Control room to JB13 for Tank farm area	150
14	24-core	SUPPLIER	Control room to JB14 for COD & FWD pumps	100
15	24-core	SUPPLIER	Control room to JB15 for the proposed Emulsion Treater 3	200
16	3-core	SUPPLIER	Junction Boxes to different Transmitters	1500

SPECIFICATION FOR CABLE TRAY

GI Perforated cable tray

Material : Galvanized
MS/ Aluminium

Thickness : 1.6mm

Shape of perforation/ hole : Oval shape

Gap between two consecutive/
Adjacent holes : 7mm (length wise)
5mm (breadth wise)

Accessories:
Coupling plates & nut bolts

Note: Tentative requirement for estimation only. Bidder is requested to visit site for exact estimation before submitting the bid

SL.NO	CABLE TRAY SIZE	SUPPLIED BY	LENGTH IN MTRS
1	200mm X 25mm X 25mm	SUPPLIER	100
2	150mm X 25mm X 25mm	SUPPLIER	400
3	50mm X 25mm X 25mm	SUPPLIER	350

PROCESS MONITORING SYSTEM **SH 1 OF 1**

SPECIFICATION OF CONTROL CABINETS

Application : Indoor
Degree of protection : IP-20
Construction : Modular, non-welded, bolted type
Mounting type : Freestanding floor
Type of sheet : CRCA (Cold rolled cast Aluminium alloy) sheet
Thickness of sheet
- Front sheet : 2 mm
- Side & Back sheet : 1.6 mm
- Top & bottom sheet : 2 mm

Paint/ Powder coating : 1st coat Epoxy coat, final coat Polyurethane paint thickness upto 40 microns.
Colour of finish paint
- Outside : Siemens gray (RAL 7032)
- Inside : Siemens gray (RAL 7032)
- Base frame : Black

Eye bolts : 4 Nos lifting eye bolts
Earthing studs : 2 Nos
Louvers : With wire mesh & filter
Size of cabinet : As required
Cable entry : Bottom with detachable plate
Cabinet illumination : Required
Lock, flush : To be provided
Gasket on Door & Gland plate : Required
Earth bus bar : Required
General arrangement drawing : Required

PREFERRED VENDORS: RITTAL

SL.NO	CABINET	SUPPLIED BY	QUANTITY
1	CONTROL SYSTEM CABINET (To mount controller modules, Power supply module, communication module, I/O Modules etc.)	SUPPLIER	1
2	TERMINATION CABINET (For field signals termination)	SUPPLIER	1

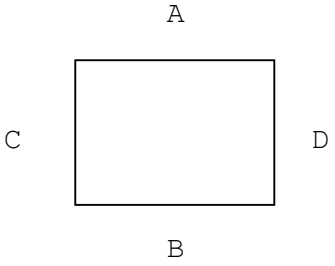
High definition LCD display FOR MIMIC

Function	:	For display of process flow diagrams
Size	:	51”
Technology	:	TFT LCD
Resolution	:	1920 X 1080 (full HD)
Life time	:	50,000 Hours average
Colors	:	16.8 million
Color gamut	:	76% NTSC
Aspect ratio	:	16:9
Viewing angle	:	$176^0/176^0$
Response time	:	8 ms
Contrast ratio	:	800:1
Brightness	:	500 cd/m^2
Light sensor	:	Ambient light sensor for automatic dimming
Standard inputs	:	DVI, VGA, S-Video, Composite Video
Control	:	RS232 control (with loop through) - On screen Display (OSD) - IR remote control
Picture in picture	:	PIP source max.110 MHz
Power supply input	:	85V-264V AC (50Hz-60Hz)
Operating Temperature:		5^0 to 40^0C

Preferred Vendors: BARCO, SAMSUNG, LG

MULTIWAY JUNCTION BOXES:

Type	:	Flameproof as per IS-2148/81
Protection	:	IP-65
External size (in mm) approximate.	:	356 X 356 X 150
No. of Terminals	:	36
Terminal size	:	2.5 mm^2
Connector type	:	Clip on type
Gasket	:	Endless Neoprene
Cable entry sizes: Incoming	:	2 X 25.4 mm (1 inch)
Outgoing	:	10 X 12.7 mm (1/2 inch)
No. of entries	:	Side A – Nil Side B – 2 X 25.4 mm Side C – 5 X 12.7 mm Side D – 5 X 12.7 mm



Thread type	:	NPT(F)
Paint shades	:	Light Grey, Epoxy shade–631 of IS–5
Operating area classification	:	Zone I, Group IIA/IIB
Certification	:	DGMS
Earthing	:	1 No.inside, 2 Nos.outside
Accessories per junction box	:	
• Cable glands (Flame proof, Brass Ni plated, double compression type with lock nut)	:	1 inch (NPT) – 2 Nos ½ inch (NPT) – 10 Nos
• Plugs/ Stoppers (Brass Ni plated)	:	1 inch (NPT) – 1 No ½ inch (NPT) – 5 Nos

Quantity: 20 Nos.(approx). – As per bidder"s system design and cable schedule.

Note: Tentative JB requirement for estimation only. Bidder is requested to visit site for exact estimation before submitting the bid. **A tentative JB schedule is attached for reference only.**

PREFERRED VENDORS: BALIGA, FCG POWER INDUSTRIES

ONLINE DUAL UN-INTERRUPTED POWER SUPPLY WITH CHANGE OVER PANEL:

One UPS will be online and the other UPS will be on load sharing mode and change over shall takes place incase of failure of the online UPS.

Input AC Parameters

Source	:	Generator
Input Voltage	:	180-265 VAC
Frequency	:	45 – 60 Hz with Auto Sensing

Output AC Parameters

Output Voltage	:	210/220/230/240 V AC (User configurable)
Frequency	:	50 +/- 0.2 Hz
Waveform	:	True Sine Wave
Over load	:	200% for 8 cycles; 130% for 10 seconds with transfer to bypass
Short circuit protection	:	To be provided
Under voltage/ Over Voltage protection	:	Inverter to shutdown

Indication & Controls

UPS ON/OFF	:	Switch
LED Indication/Display	:	Line Input, Bypass, Battery And Load Level Indications
Audio Alarm operation	:	At start of Battery Operation-To beep every 6 seconds

Overload condition -Continuous beep

Battery parameters

Type : Sealed maintenance free Lead Acid batteries

Voltage : 12V Standard Batteries of reputed Indian make

Backup time : The batteries should be so sized that a minimum of 12 hours backup time should be available at full load

Environmental

Operating Temperature : 0^0C to 50^0C

SL.NO	UPS SYSTEM	SUPPLIED BY	CAPACITY	QTY.
1	DUAL UPS WITH CHANGE OVER PANEL	SUPPLIER	AS REQUIRED	1 SET

PREFFERED VENDORS: DB ELECTRONICS, TATA LIBERTY, EMERSON, POWERWARE

1.0 SCHEDULE OF PRICES

All the quoted prices shall be firm till the completion of said works. Please note that no price details should be uploaded in Technical RFx Response.

SL NO	PARTICULARS	QUANTITY	EX-WORKS PRICE	PACKING/ FORWARDING & TRANSPORTATION	EXCISE DUTY	SALES TAX	TOTAL PRICE
	CONTROL ROOM EQUIPMENT						
1	ENGINEERS STATION	1					
2	OPERATORS STATION	1					
3	REMOTE OPEARTOR STATION	1					
4	CONTROLLER WITH REDUNDANT CPU	AS REQUIRED					
5	ANALOG INPUT MODULE	AS REQUIRED					
6	ANALOG OUTPUT MODULE	AS REQUIRED					
7	DIGITAL INPUT MODULE	AS REQUIRED					
8	DIGITAL OUTPUT MODULE	AS REQUIRED					
9	POWER SUPPLY MODULE WITH REDUNDANCY	AS REQUIRED					
10	COMMUNICATION MODULE WITH CABLE	AS REQUIRED					
11	HARDWARE/SOFTWARE FOR DATA LINK TO REMOTE STATION	AS REQUIRED					
12	24 PIN HEAVY DUTY DOT-MATRIX PRINTER	1					
13	COLOUR INK-JET PRINTER	1					
14	MTL/P&f ZENER BARRIER FOR SMART TRANSMITTERS	AS REQUIRED					
15	MTL/p&f ZENER BARRIER FOR SWITCHES	AS REQUIRED					
16	MTL/p&f ZENER BARRIER FOR I/P CONVERTERS	AS REQUIRED					
17	CABINETS AND FURNITURE	AS REQUIRED					
18	SOFTWARE	AS REQUIRED					

19	DC POWER SUPPLY FOR FIELD INSTRUMENTS	1					
20	UPS WITH BATTERY BACKUP –	2					

	5KVA/12HRS BACKUP						
21	LCD PANEL -51INCH	1					
	FIELD INSTRUMENTS WITH ACCESSORIES						
22	DIAPHRAGM SEALED PRESSURE TRANSMITTERS	64					
23	PRESSURE TRANSMITTERS	6					
24	TEMPARATURE TRANSMITTERS WITH RTD & THERMOWELL	10					
25	FLAME SENSORS (THERMOCOUPLE WITH TEMP. CONTROLLER)	6					
26	DP TRANSMITTERS	NIL					
27	RADAR TANK GAUGE	1					
28	INTERFACE LEVEL TRANSMITTER	4					
29	LEVEL TRANSMITTERS	14					
30	I/P CONVERTERS	26					
31	SOLENOID VALVE	NIL					
32	PRESSURE SWITCHES	2					
33	WATER-IN-OIL-MONITOR	3					
36	CONTROL CABLE 24-CORE	AS REQUIRED APPROX-2000 MTRS					
37	CONTROL CABLE 3-CORE	AS REQUIRED APPROX-1500 MTRS					
38	Junction boxes	AS REQUIRED APPROX-20 nos.					

38	G.I CABLE TRAYS 200mm X 25mm 1.6mm Thickness	AS REQUIRED APPROX-150 MTRS					
39	G.I CABLE TRAYS 150mm X 25mm 1.6mm Thickness	AS REQUIRED APPROX-450 MTRS					
40	G.I CABLE TRAYS 50mm X 25mm 1.6mm Thickness	AS REQUIRED APPROX-300 MTRS					
41	INSTRUMENT FITTINGS, TUBING, ISOLATION VALVES, 2 INCH STAND PIPES ETC	AS REQUIRED APPROX-BREAKUP AS PER SECTION-E2, SHEET4					
42	INSTALLATION, TESTING, COMMISSIONING & TRAINING	AS REQUIRED					
43	ANY OTHER HARDWARE/SERVICE	AS REQUIRED					

2.0 Are all technical particulars as per specification YES / NO

If NO, Technical deviation Schedule filled? YES / NO

3.0 Are prices firm? YES / NO

4.0 Guaranteed firm delivery from The date of Letter of Intent for The supply and erection of Instruments And control system as offered by The SUPPLIER

5.0 Bid validity period

16 WARRANTY period for the above

SIGNATURE: ----------

NAME: ----------

DESIGNATION: ----------

COMPANY: ----------

SEAL OF THE COMPANY DATE: ----------

SCHEDULE OF PRICES

(SCHEDULE OF UNIT RATES FOR INSTRUMENT ERECTION, HARDWARE MATERIAL & MISCELLANEOUS FITTINGS)

SL. NO	Description	Size	Materi-al	Pressure rating in PSIG	Qty.	Unit rate	Total
1	MALE CONNECTOR	½"NPT(M) x ½" OD	SS316	1500	96 Nos		
2	NEEDLE VALVE	½"NPT(F)	SS316	1500	48 Nos		
3	BALL VALVE	½"NPT(F)	SS316	2250	40 Nos		
4	UNION TEE	½" OD	SS316	1500	16 Nos		
5	TUBE	½" OD	SS316	1500	100 Mtr		
6	NIPPLE	½" X 6"	SS316	2250	100 Nos		
7	FEMALE CONNECTOR	½"NPT(F) x ½" OD	SS316	2250	10 Nos		
8	2" STAND PIPES	2" x 6'	MS	NA	AS REQUIRED APPROX-100 Nos		
9	Male connector ½"x1/4"ODT	½"x1/4"ODT	SS316	2250	AS REQUIRED APPROX-50		
10	NEEDLE VALVE	1/4" NPT(F)	SS316	1500	50 Nos		
11	Male connector	¼"inch	SS316	2250	250		
12	NIPPLE	1/4" X 4"	SS316	2250	50 Nos		
13	TUBE	¼ " OD	SS316	1500	250 Mtr		
14	CANOPY	AS PER INST. SIZE	AS PER STANDARD	–	100NOS.		
15	Flameproof JB with 24 terminals	–	–	–	AS REQUIRED APPROX-20 Nos		
16	GI ANGLE	40X40X5	GI	–	2000M		

NOTE:

1) Tentative requirement for estimation only. Bidder is requested to visit site for exact estimation before submitting the bid

AMC charges for 1st year after expiry Of warranty

SIGNATURE: ----------

COMPANY SEAL DESIGNATION: ----------

CHECK LIST

The supplier has to fill up the CHECK LIST for compliance and any deviations to be specified in the format given in Section E-3.

SL.NO	REQUIREMENT	COMPLIANCE YES NO	REMARKS
	CONTROL SYSTEM		
1	The Control system offered shall meet the specifications given in Data sheets D1 and D2		
2	30% Spare capacity shall be provided in AI(Analogue Input), AO(Analogue Output), DI(Digital Input) & DO(Digital Output) cards		
3	Redundant processor shall be provided		
4	Redundant power supply shall be provided		
5	The Main memory of the Control system shall have 40% spare capacity after final commissioning		
6	AGA-3 & NX-19 Gas flow calculation software shall be provided in the system		
7	Communication interface shall be provided for remote transmission		
8	UPS of suitable capacity with TWELVE HOURS(12) backup time shall be provided		
9	DC Power supply of suitable capacity for powering Field Instruments shall be provided		
10	MTL/P&F Zener Barriers shall be provided for all the AI, AO & DI to the system.		
11	The OPERATORs & ENGINEER'S stations (MMI) shall meet the specifications and contains the sub-units as specified under clause 3.1.9		
12	Licensed software shall be provided		

	FIELD INSTRUMENTS		
13	The Field Instruments offered shall meet the specifications given in data sheets D4 to D20		
14	Accessories for each Instrument as mentioned in Data sheets D4 to D20 shall be provided		
15	All the Field Instruments shall be designed and manufactured to operate in Class1, Division1&2, Group C&D environment		
16	All the Field Instruments shall be equipped with lightning protection		
17	All the Field Instruments shall operate on 24V DC Power supply		
	ERECTION AND COMMISSIONING		
18	Control Cable & Cable trays shall meet the specifications as given in Data sheets D15 and D16		
19	Control system cabinets shall meet the specifications as given in Data sheet D17		
20	Field Instruments erection Hardware shall be supplied as per the erection sketches enclosed		

	GENERAL CONDITIONS		
1	Quoted for all the items as per the Schedule of prices in Section E-2		
2	Detailed Technical literature of each equipment offered is enclosed with the offer		
3	Equipment GUARANTEE as per clause No:14.0 of Section C shall be Provided		
4	DOCUMENTATION shall be provided as per Clause No:12.0 of section C		
5	The Equipment shall be offered for INSPECTION as per Clause No:13.0 of Section C		
6	TRAINING shall be provided as per Clause No: 11.0 of Section C		
7	DGMS approval shall be provided for all the Field Instruments supplied		

2.0 Are all technical particulars as per specification YES / NO

If NO, Technical deviation Schedule filled? YES / NO

SIGNATURE: ----------

DESIGNATION: ----------

COMPANY: ----------

COMPANY SEAL DATE: ----------

1.0 SCHEDULE OF DEVIATIONS FROM TECHNICAL SPECIFICATION

All the deviations from the technical specifications shall be filled-in by the SUPPLIER clause by clause in this schedule.

SECTION	SPECIFICATION NO.	CLAUSE NO.	DEVIATION

The SUPPLIER hereby certifies that the above mentioned are the only deviations from the client's Technical specifications for this enquiry. The SUPPLIER further confirms that in the event of any other data and information presented in the SUPPLIER'S proposal and accompanying documents including drawings, catalogues, etc., are at variance with the specific requirements laid out in the Client's technical specifications, then the latter shall govern and will be binding on the SUPPLIER for the quoted price.

SIGNATURE: ----------

DESIGNATION: ----------

COMPANY: ----------

COMPANY SEAL

DATE: ----------

1.0 SUPPLIER'S EXPERIENCE

The SUPPLIER shall furnish here a list of similar jobs executed by him to whom a reference may be made in case OIL considers such a reference necessary.

SL NO	NAME AND DESCRIPTION OF WORK	VALUE OF WORK	PERIOD OF CONSTRUCTION AND DATE	CLIENT	PERSONS TO WHOM REFERENC

					E MAY BE MADE

SIGNATURE: ----------

DESIGNATION: ----------

COMPANY: ----------

COMPANY SEAL DATE: ----------

1.0 SCHEDULE OF RECOMMENDED SPARE PARTS

The SUPPLIER shall give below a list of spare parts recommended for TWO years trouble free operation of the equipment offered by him. **However, the same will not be considered for evaluation.**

SL NO	MANUFACTURER & PART NO.	DESCRIPTION	QUANTITY RECOMMEN-DED	UNIT PRICE	TOTAL PRICE	REMARKS

2.0 ANNUAL MAINTENANCE CONTRACT:

The BIDDER shall provide AMC offer for maintaining the Data Acquisition and control system with necessary terms and conditions. **Charges for AMC will not be considered for evaluation**.AMC will be continued separately after expiary of the warrenty period..

SIGNATURE: ----------

DESIGNATION: ----------

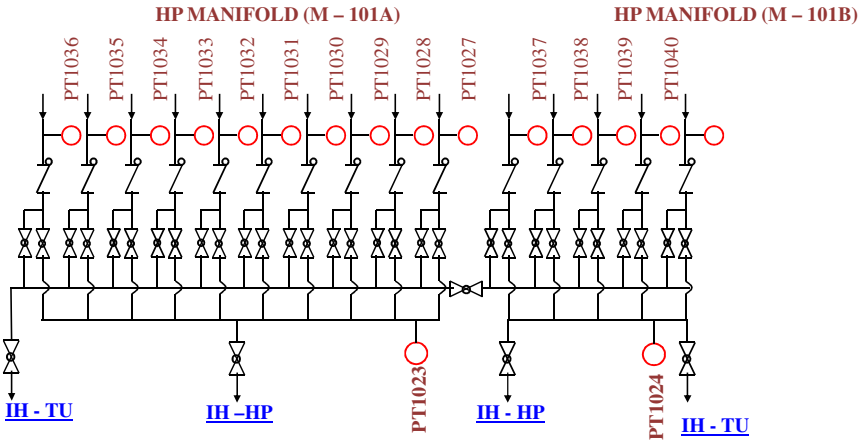
COMPANY: ----------

COMPANY SEAL DATE: ----------

New-MANIFOLD

1. HP Manifold header 4 nos.(M-101A{10 wells},101B{4 wells},101C{10 wells},101D{10 wells})
2. LP Manifolds header 3 nos.(M-102A{3 wells}, M-102B{3 wells},M-102C{13 wells})

BACK

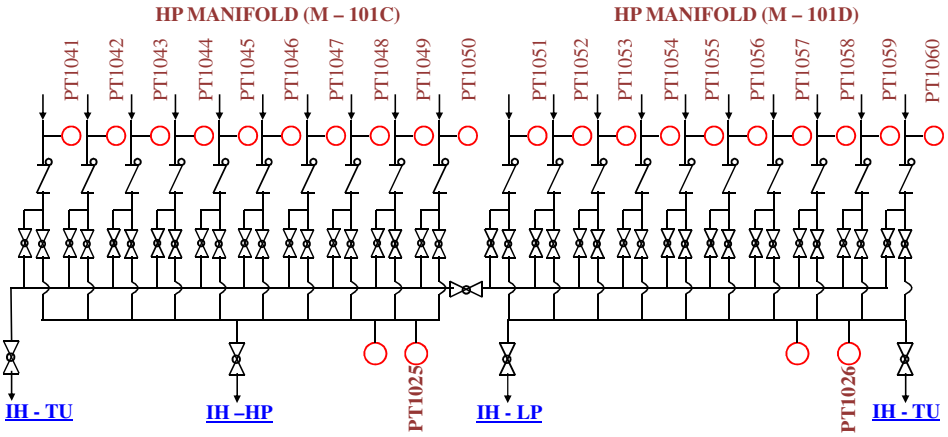


1

New-MANIFOLD

1. HP Manifold header 4 nos.(M-101A{10 wells},101B{4 wells},101C{10 wells},101D{10 wells})
2. LP Manifolds header 3 nos.(M-102A{3 wells}, M-102B{3 wells},M-102C{13 wells})

BACK

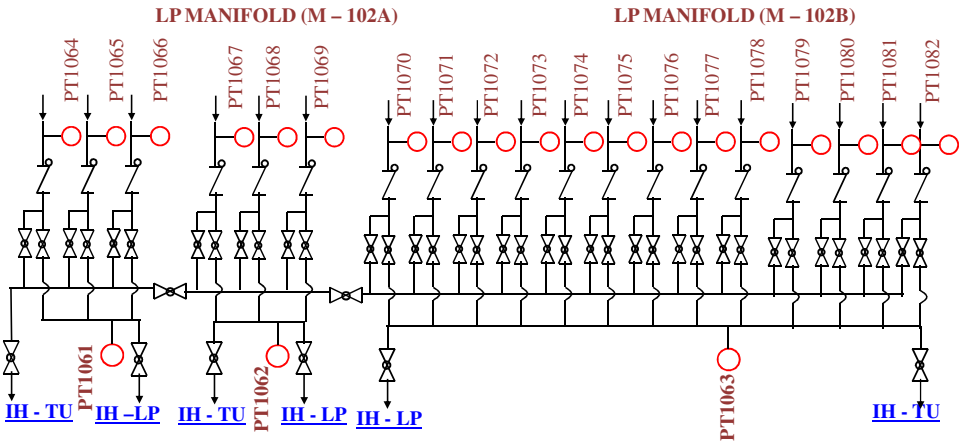


2

New-MANIFOLD

1. HP Manifold header 4 nos.(M-101A{10 wells},101B{4 wells},101C{10 wells},101D{10 wells})
2. LP Manifolds header 3 nos.(M-102A{3 wells}, M-102B{3 wells},M-102C{13 wells})

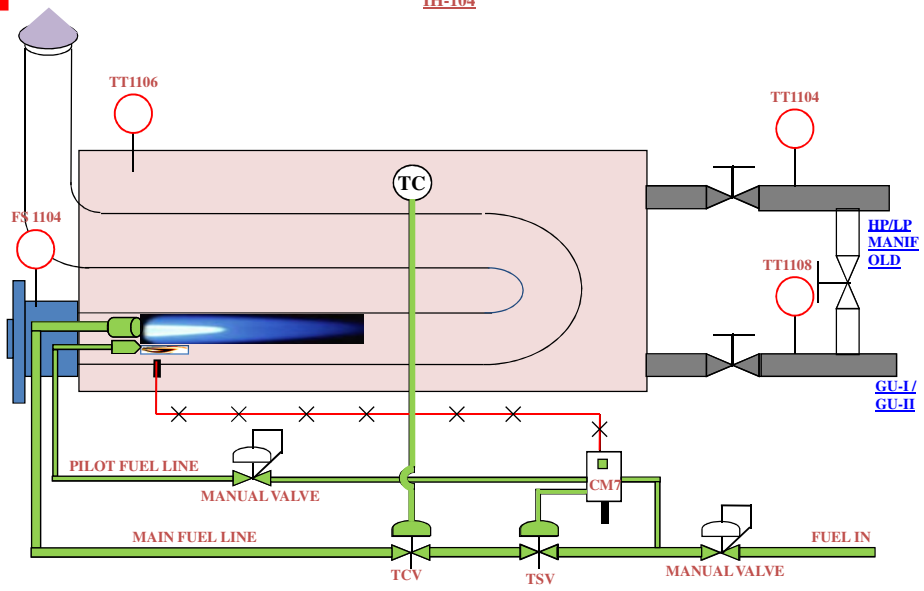
BACK



3

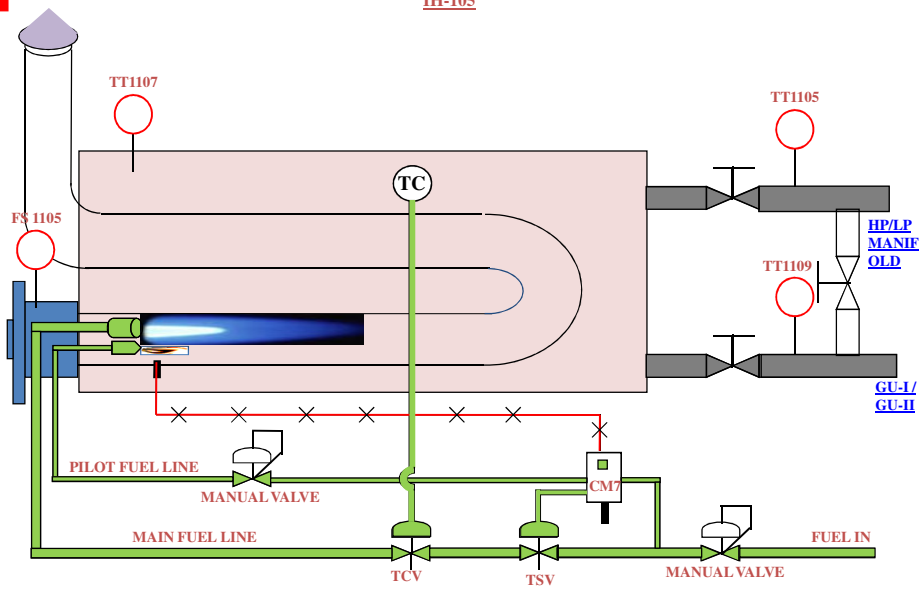
New Indirect Heater 2 nos.
IH-104

BACK



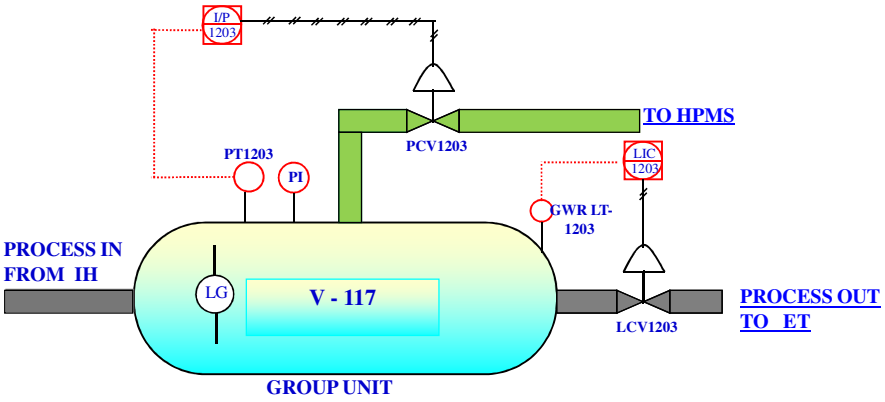
New Indirect Heater 2 nos.
IH-105

BACK



GROUP UNIT-I(New 2 nos. GU-I(3) & GU-I(4)

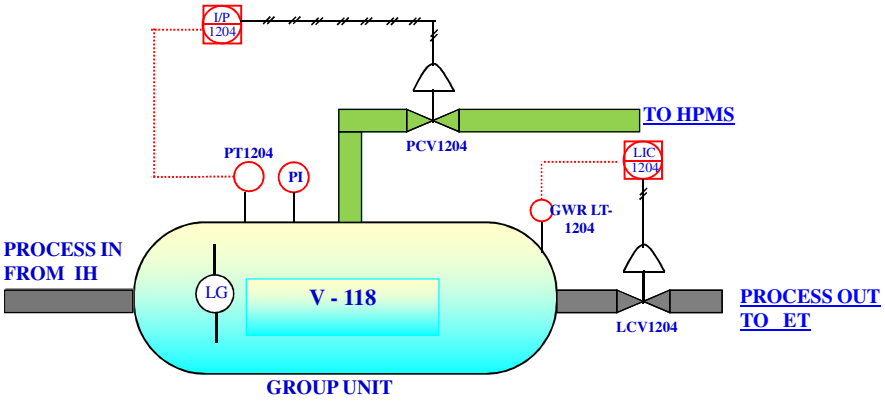
BACK



6

GROUP UNIT-I (New 2 nos. GU-I (3) & GU-I(4)

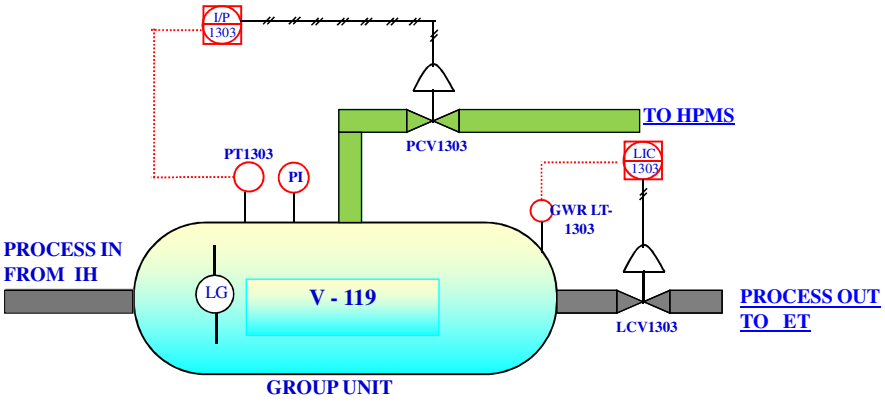
BACK



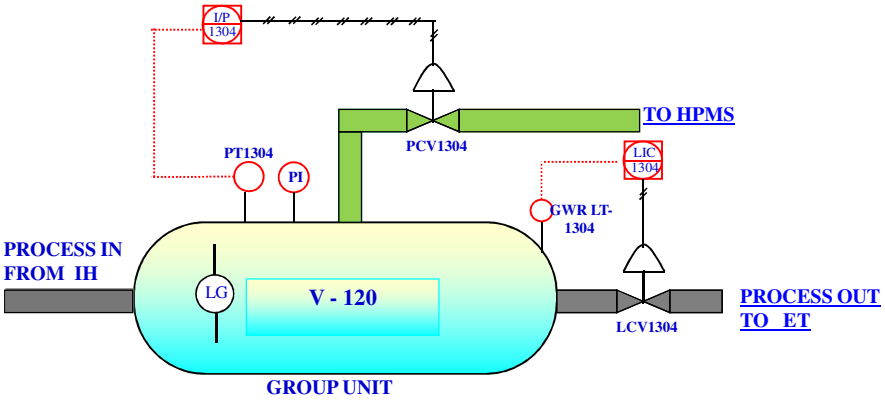
7

GROUP UNIT-II(New 2 nos. GU-II(3) & GU-II(4)

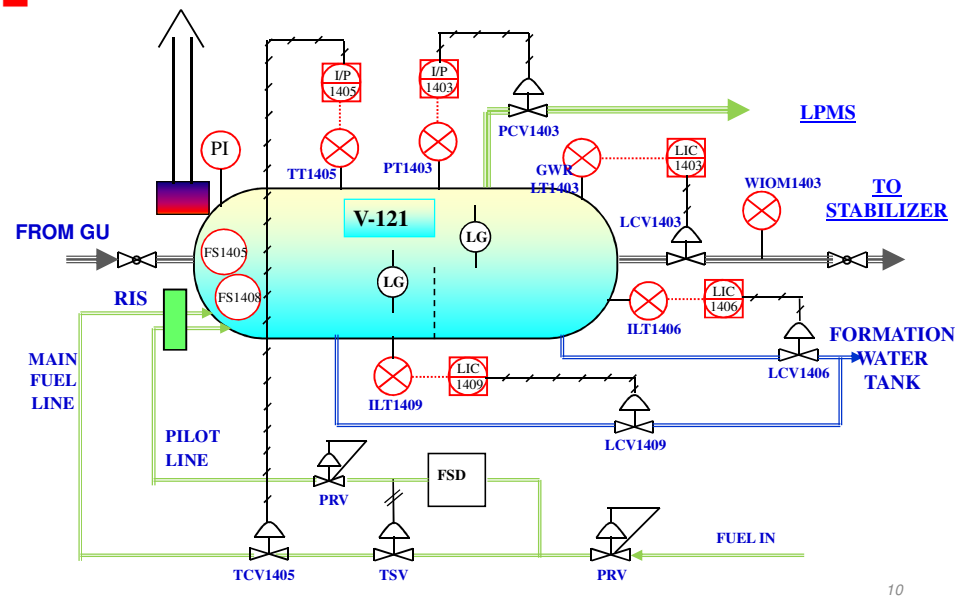
BACK



8


I/P 1304
TO HPMS
PCV1304
PT1304
PI
LIC 1304
GWR LT-1304
PROCESS IN FROM IH
LG
V - 120
LCV1304
PROCESS OUT TO ET
GROUP UNIT

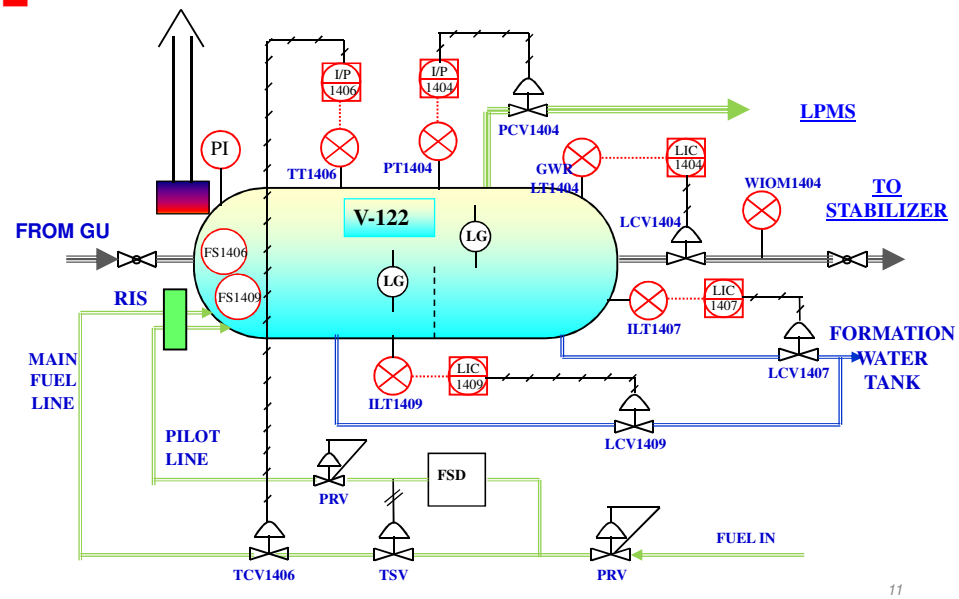
9


I/P 1405
I/P 1403
LPMS
PCV1403
PI
TT1405
PT1403
GWR LT1403
LIC 1403
WIOM1403
TO STABILIZER
FROM GU
V-121
LG
LCV1403
FS1405
FS1408
RIS
LIC 1406
ILT1406
FORMATION WATER TANK
MAIN FUEL LINE
LIC 1409
ILT1409
LCV1406
LCV1409
PILOT LINE
PRV
FSD
FUEL IN
TCV1405
TSV
PRV

10

EMULSION TREATER NEW 2 NOS.
V-121&V-122

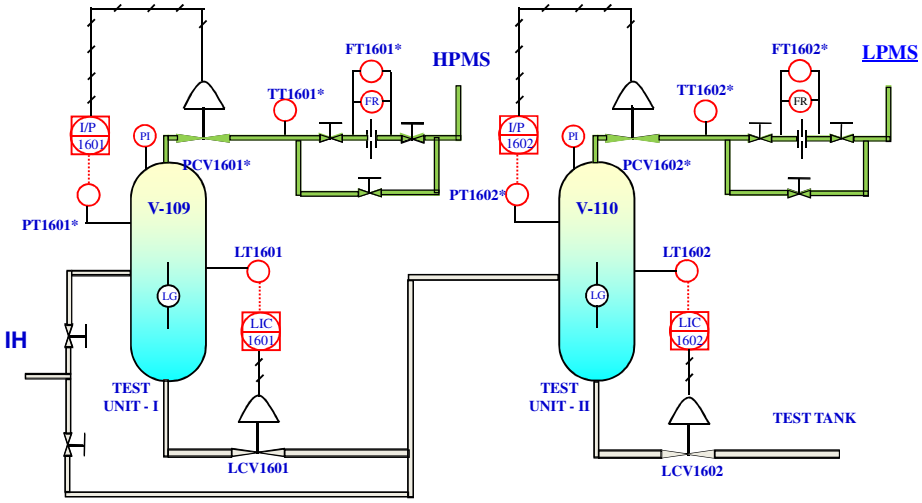
BACK



11

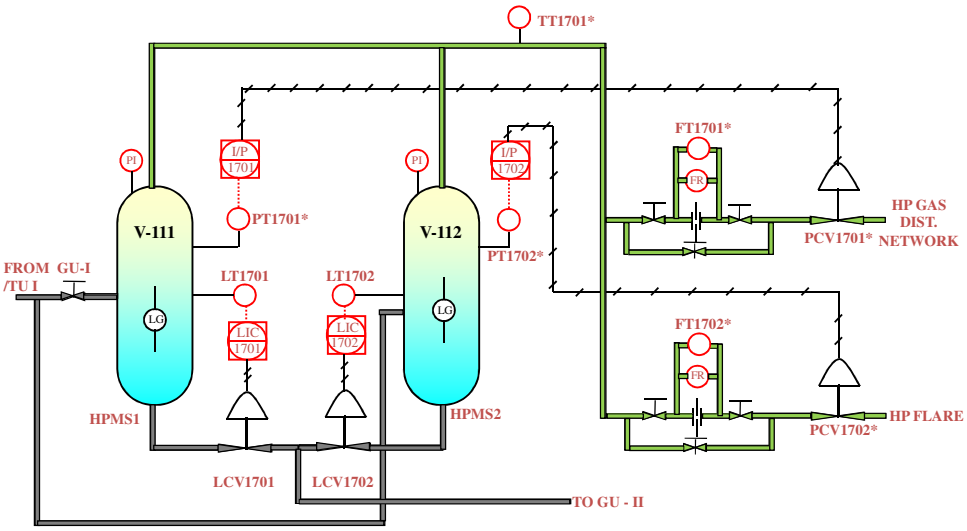
BACK

TEST UNIT 2 NOS. (Only level instruments to be connected)



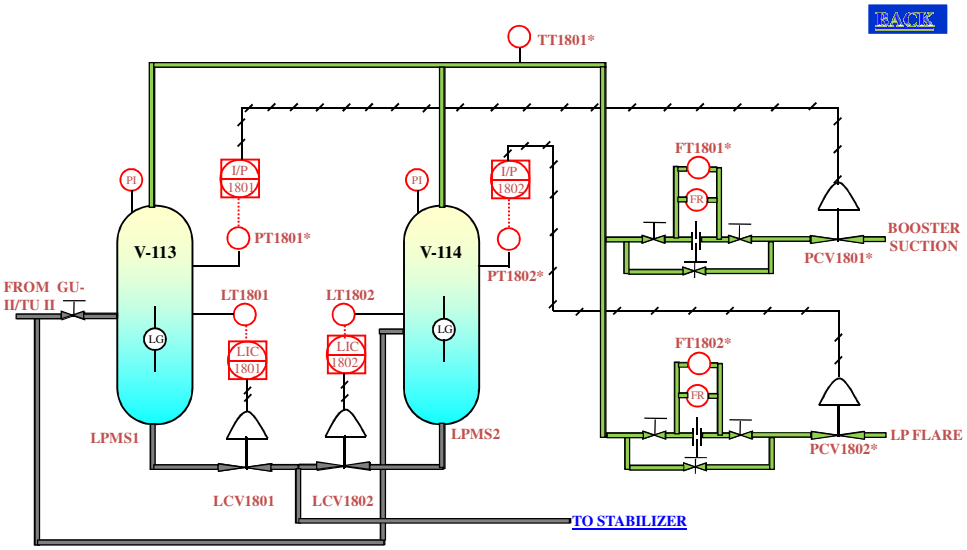
12

HIGH PRESSURE MASTER SEPARATOR(2 nos. only level instruments to be connected)



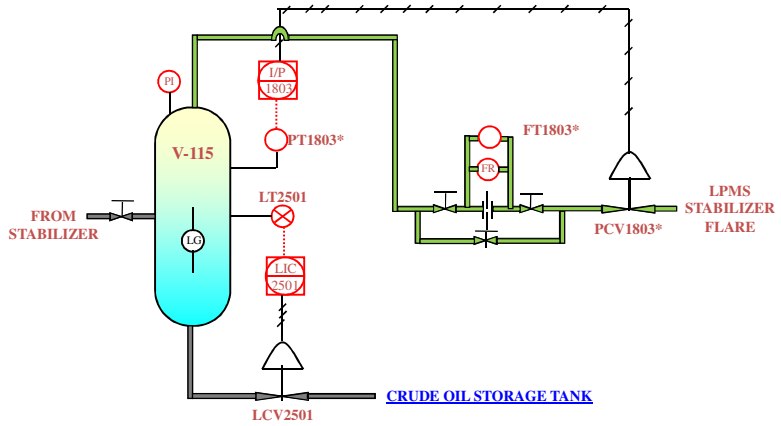
LOW PRESSURE MASTER SEPARATOR(2 nos. only level instruments to be connected)

BACK



VLPMS1 no.(only level instrument to be connected)

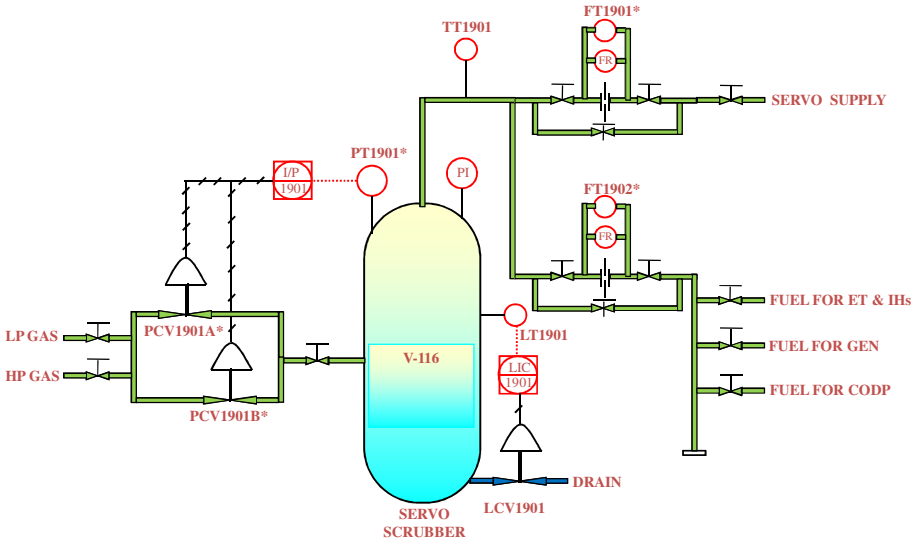
BACK



15

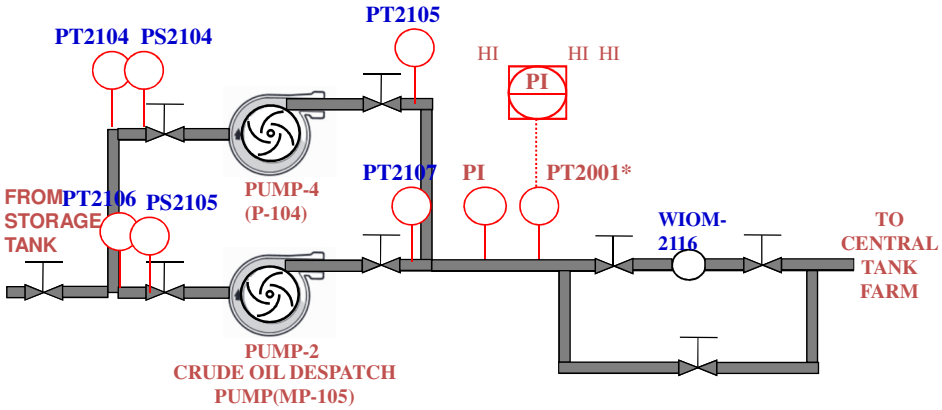
SERVO SCRUBBER(Only level instrument to be connected)

BACK



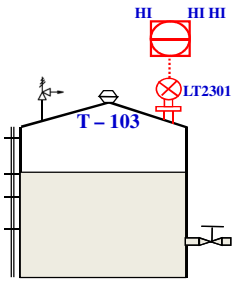
CRUDE OIL DESPATCH PUMPS N NOS. NEW

BACK

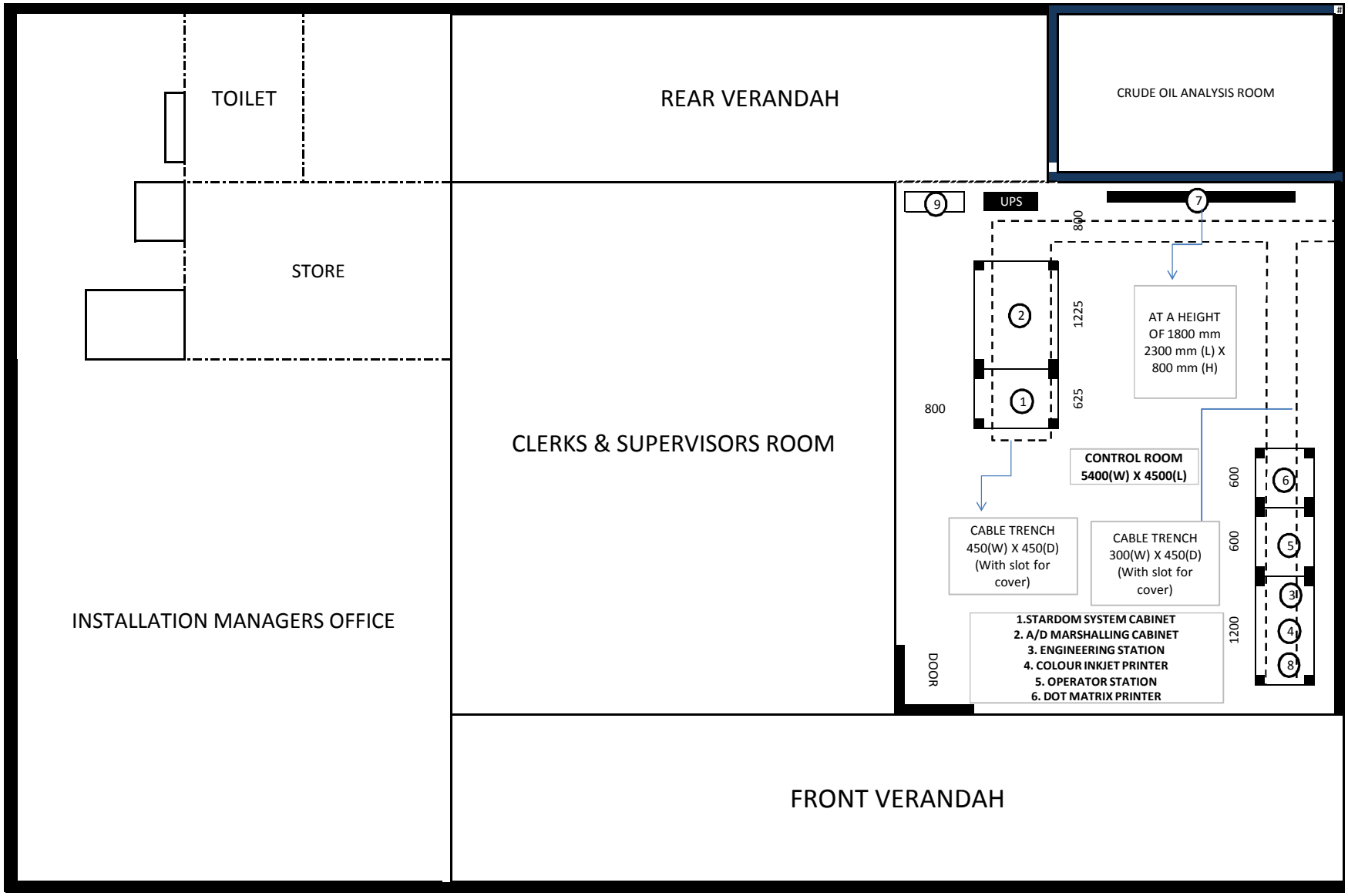


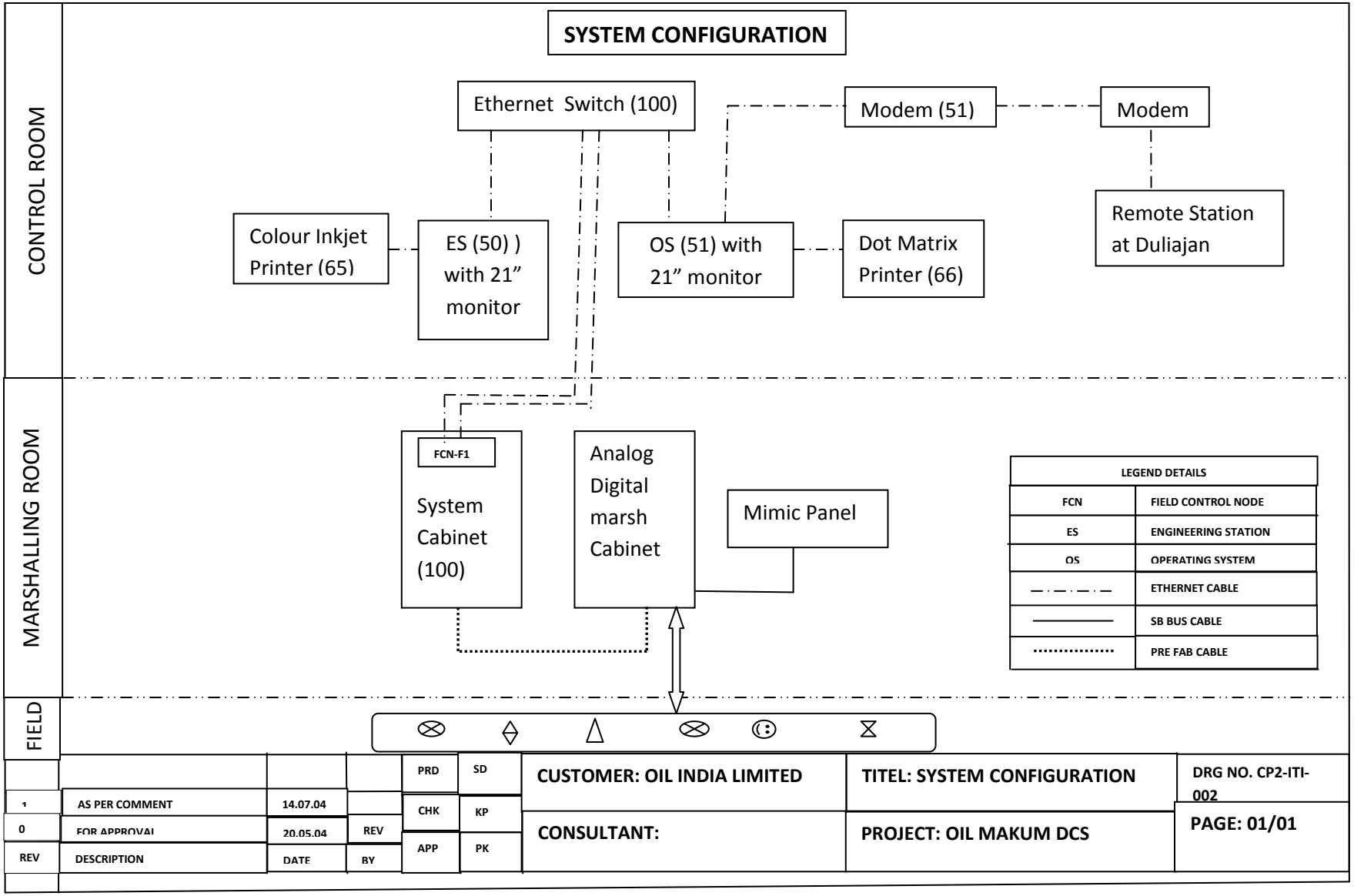
TEST TANK(1 NO.)

BACK



ANNEXURE II-C




SYSTEM CONFIGURATION
CONTROL ROOM
MARSHALLING ROOM
FIELD
Ethernet Switch (100)
Modem (51)
Modem
Remote Station at Duliajan
Colour Inkjet Printer (65)
ES (50)) with 21" monitor
OS (51) with 21" monitor
Dot Matrix Printer (66)
FCN-F1
System Cabinet (100)
Analog Digital marsh Cabinet
Mimic Panel
LEGEND DETAILS
FCN
FIELD CONTROL NODE
ES
ENGINEERING STATION
OS
OPERATING SYSTEM
ETHERNET CABLE
SB BUS CABLE
PRE FAB CABLE
REV
DESCRIPTION
DATE
BY
1
AS PER COMMENT
14.07.04
0
FOR APPROVAL
20.05.04
REV
PRD
SD
CHK
KP
APP
PK
CUSTOMER: OIL INDIA LIMITED
TITEL: SYSTEM CONFIGURATION
DRG NO. CP2-ITI-002
CONSULTANT:
PROJECT: OIL MAKUM DCS
PAGE: 01/01