### MIDLAND REFINERIES CO. ANNOUNCES FOR PURCHASING THE MATERIALS AS STATED BELOW -

<table>
<thead>
<tr>
<th>REG.NO.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>ADVERTISMENT NO.</th>
<th>BID BOND</th>
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<tr>
<td>3593/2015</td>
<td>PROJECT OF HEAVY PRODUCTS TRUCKS LOADING STATION</td>
<td>1 NO.</td>
<td>ONCE</td>
<td>103000 $</td>
</tr>
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</table>

1. The Requisition to be sold in (1,500,000) (one million five hundred thousand only Iraqi dinars). Unreturnable or to transfer this amount to mrc bank account number (90956)in Rafidain Bank head branch.

2. Technical and Commercial offer should be opened at The same time, The representatives of the companies can be attend to our company (MRC) at 10 O'clock morning one day after the closing day stated below in item (25).

3. Offered prices should be (CIP) Baghdad / Daura refinery and preferred to be in us dollar. They will be final and un-negotiable. (MRC) is not obliged to accept the lowest prices.

4. Offers (Technical & Commercial) to be submitted, separately in sealed envelopes, either directly at (MRC) reception bureau or sent by (DHL). The requisition number, the description and the closing date should be fixed on both envelopes. The validity of the offer should be mentioned within the technical offer; also on the envelope of the commercial offer. Offers sent by E-mail will be neglected.

5. The validity of the Bid Bond and the offer should be mentioned within both offers and should not be less than (120) days.

6. All pages of, Both, The Technical and Commercial offers should be numbered in sequence, Including The Attachments and Documents.

7. All Documents (Profile) and similar contracts achieved, issued by Governmental Contracts should be submitted before purchasing the Req. for the current year or enclosed within the technical offer.

8. A bid bond of amount that stated in the advertisement above against each tender should be submitted with commercial offer from one of the participant in the company according to instruction as (letter of guarantee, certified cheque or bank guarantee) (original copy), issued from: (kurdistan international bank, north bank, arbil international bank, gihan bank for islamic investment & finance, union bank of iraq, al mansour bank for investment, national islamic bank, region for business investment and financing (emerald bank bef), bank of baghdad, gulf commercial bank, squer for commercial, credit bank iraqi, investment bank of iraq, ashur international bank for investment, international development for investment & finance, national bank of iraq, iraqi islamic cooperative bank for investment, commercial bank, byblos bank, dijlah & furat bank for development & investment & iraqi middle east investment bank, bank med and released immediately in case the requisition is not awarded. Cheques & bank guarantees issued from [alwarkaa bank – islamic bilad bank, united bank for investment or basrah international bank, al-huda bank, economy bank for investment & finance] are not acceptable. This bid bond should be valid for not less than (120) days & this bid bond should be confiscated if the companies don’t respond to (answered for) the correspondence during the technical & commercial study.

9. The delivery period (in days) should be, exactly specified.

10. Based terms of payment is by irrevocable & Unconfirmed letter of credit to be paid (100%) after the receipt of goods in Baghdad complete and as ordered. Other terms of payment may be, mutually, agreed upon letter and for certain conditions, which are: a portion of the total amount to be paid, but against bank guarantee or by bank transfer if requested by any company the prices of all offers are calculated according to the exchange rate of the central bank of Iraq at the date of opening the offers. for the purpose of preferability and by iraqi dinar only, for iraqi companies according to the exchange rate of the control bank of Iraq at the date of opening the offers.

11. DELAY PENALTY TO BE APPLIED WITH TOTAL AMOUNT, NOT EXCEEDING (10%) OF THE TOTAL VALUE OF THE P/O.

12. An Unconditional Performance Bond of (5%) of The Total value of The contract to be submitted, from one of the participant in the company as a letter of Guarantee (only) after the letter of award and before signing the contract according to instruction, from one of the banks mentioned in item (8) within (15) fifteen Days from the Date, The Supplier is informed of the award. For any delay beyond the specified period, this award will be cancelled and the supplier will be considered as a shirker. The issue of the (L/C) depends, mainly, on submitting this bond. The performance bond should be valid for two months later than the delivery period or until the guarantee period (if stated), is over. This performance bond will be released after the receipt of goods complete and as ordered and the supplier has fulfilled all his commitments regarding the p/o; otherwise, it will be confiscated.

13. (3%) of the total value of the contract to be deducted as taxes for Iraqi companies. Also, in case the payment is in iraqi dinar for non-Iraqi companies, this amount will be retained as taxes and will be released when a tax discharge issued by (the Iraqi state committee of taxes) in favor of the company is submitted within (180) days from the date of receipt of the goods complete and as ordered. Otherwise, this amount will be sent to the (tax committee).

14. (0.002) of the total value of the contract to be deducted as stamp charges.

15. A sum of (205,000.00 ID), to be deducted as cost of import license.

16. origin Certificate should be approved by Irani Embassy/Commercial attaché in the country of origin.

17. the participant has no right to omit or make any amendment, whatsoever, to any of the paragraphs of the requisition document.

18. The Origin of the materials should be specified in the offer and fixed. And will not be changed for any reason stated the method & the port of shipment & the entry point.

19. Third Party Inspection Certificate should be provided from one of the following companies: [Lloyd’s register – Bureau Veritas - InterTek Global - Tuv Rheinland - DNV]

20. All offers and correspondences should be, clearly, signed by the general manager or whom is officially empowered via power of attorney. Otherwise, the offer will be neglected.

21. IT IS NECESSARY TO PRESENT AUTHORIZATION LETTER FROM THE MANUFACTURER COMPANIES CERTIFIED FROM MINISTRY OF FOREIGN AFFAIRS OR EMBASSY OR CONSULATE OR THE COMMERCIAL ATTACHED IN COUNTRY OF ORIGIN.

22. In case the supplier fails to supply all or part of the requested materials as ordered and according to the technical specification stated in the purchase order, our company has the right to deduct their cost at the highest offered price submitted by competitors in the table of price analysis for such items.

23. The awarded supplier will bear the advertising fees value (100 $).

24. if stated), Is over. This performance bond will be released after the receipt of goods complete and as ordered and the supplier has fulfilled all his commitments regarding the p/o; otherwise, it will be confiscated.

25. For chemical (req) the sample should be submitted with the technical & commercial offers before or (during) the closing otherwise the offer will be neglected.

26. the contracted company shall not deal with israel in any way; otherwise, it shall bear all the legal consequences.

27. Closing date: 15 / 12 / 2015, till (1:00) o'clock (afternoon).

Note: you can find the conditions of submitting offers on website: www.oil.gov.iq - www.mrc.oil.gov.iq

SAAD NOORI MOHAMMED
G. MANAGER
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INVITATION TO BID

ITB No. 3593 / 2015

SUBJECT: EPC PROJECT
REFINERY: DAURA REFINERY
PROJECT SECTOR: EXPANSION PROJECTS OF DAURA LUBE FACILITIES
PROJECT TITLE: HEAVY PRODUCTS TRUCKS LOADING STATION

Please find enclosed our TENDER ref. ITB No: 3593 / 2015 relating to ENGINEERING, PROCUREMENT AND CONSTRUCTION (TURN KEY PROJECT) of the HEAVY PRODUCTS TRUCKS LOADING STATION project located at MRC / DAURA REFINERY SITE in BAGHDAD - IRAQ.

Your comprehensive bid shall be sent to MIDLAND REFINERY COMPANY by your representative on XX/XX/ at noon.

Looking forward to receiving your proposal, we remain at your disposal for any further information you may need.

Yours faithfully,

Emaad Ibrahim
Engineering Department Manager
HEAVY PRODUCTS TRUCKS LOADING STATION

INSTRUCTION TO BIDDER
INSTRUCTION TO BIDDER

HEAVY PRODUCTS TRUCKS LOADING STATION

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1. INTRODUCTION

MIDLAND REFINERIES COMPANY (MRC) / DAURA REFINERY, intends to design and construct HEAVY PRODUCTS TRUCKS LOADING STATION. The station shall be implemented as LSTK (LUMP SUM TURN KEY) basis, and the expected project construction period time shall be not more than 18 months from the commencement date of the contract, this including Engineering, Procurement, Construction, Pre-commissioning, Commissioning, Supervision and start-up activities.

BIDDER is advised that the BID is in competition with others, the BID documents have been compiled to provide an equal opportunity for all BIDDERS to comply strictly with the requirements of the BID.

BIDDERS shall be to complete the project in accordance with all BID / DOCUMENTS for the consideration.
2. DEFINITIONS

The following expressions and derivatives thereof appearing in capital letters in the BID DOCUMENTS shall have the meanings hereby assigned to them.

2.1 OWNER shall mean MIDLANDS REFINERIES COMPANY (MRC).

2.2 BIDDER shall mean the company, partnership or other person who participate to this tender document and references to CONTRACTOR shall mean the selected BIDDER for the Contract.

2.3 Information contained within this document shall be the sole basis for the CONTRACTORS BID and nothing shall be deemed to change or supplement this basis except for revisions to the BID documents issued to BIDDERS by OWNER.

2.4 BID shall mean the BIDDER's offer to perform the WORK, and any subsequent revised offer in response to OWNER request.

2.5 WORK shall mean the engineering, procurement, pre-commissioning, commissioning, supervision, startup activities and any other related SERVICES to be performed by the CONTRACTOR as described in the BID DOCUMENTS.

2.6 BID DOCUMENTS shall mean the documents remitted by OWNER as listed below together with any addenda that may be issued by OWNER prior to the closing date

The bid documents include (but not limited) to the following:

- The instructions to bidders
- The terms and conditions
- The technical annexes

2.7 The word (HPTLS) refer here and after to HEAVY PRODUCTS TRUCKS LOADING STATION.
3. **BIDDING CONDITIONS**

3.1 The BID shall be prepared and submitted in strict accordance with the Instructions to BIDDERS. BIDDER shall bear all costs and expenses for preparing the BID and all activities that may lead up to the award of the contract.

3.2 The BID shall fully comply with the Instructions to BIDDERS. The BID shall not contain ambiguities and shall be fully comprehensive in order to facilitate OWNER’s evaluation thereof (NO BID SHALL BE ACCEPTED BY OWNER IN ANY OTHER FORM).

3.3 BIDDERS shall be responsible for complying with and being fully aware of all applicable governmental and local laws, regulations, practices, codes and requirements which might affect them when bidding and executing and performing its obligations under the CONTRACT. BIDDER shall thoroughly familiarize itself with IRAQI labour laws as applicable for the performance of the CONTRACT.

3.4 The bidder shall present all the company's registration papers from the relevant authorizing bodies besides the authentications and registrations mandated by Iraqi law from the Iraqi embassy in the country of origin foreign ministry, and ministry of commerce inside Iraq (This not applicable for state companies).

3.5 BIDDERS shall check that all BID DOCUMENTS have been received.

   OWNER reserves its right to modify or amend any part of the BID DOCUMENTS prior to the acceptance of any BID. Such modifications or amendments shall be notified to BIDDERS who shall be given the opportunity to modify or amend any part of their BID which has been submitted prior to such modification or amendment being made.

   Any modifications and/or additional instructions issued by OWNER during the BID period shall be issued as Addenda to the BID DOCUMENTS.

3.6 OWNER shall be entitled to reject any and all BIDS at any time before awarding the contract without any legal impact and shall not be bound to accept the lowest bid price.

3.7 The replies to questions shall be distributed to all BIDDERS and if bid conditions are affected, an addendum to the ITB documents shall be issued. No questions shall be answered if received by OWNER less than seven calendar days prior to the closing date given for receiving the BID.
3.8 BIDDER shall be deemed to have satisfied itself as to the correctness and sufficiency of the BID. No claims whatsoever shall be entertained arising out of BIDDER’s failure to study the BID DOCUMENTS. BIDDER is encouraged to raise any necessary clarifications that it may require in respect of the BID DOCUMENTS prior to the submission of the BID.

3.9 The BID DOCUMENTS shall remain at all times the property of OWNER and shall be used by the BIDDER solely for the purposes of preparation and submission of a BID. BIDDER shall keep all such documents confidential and shall not release them or any part thereof to a third party other than for the purpose of preparing and submitting a BID. BIDDER before releasing any information to third parties shall ensure that the party or parties receiving the information sign confidentiality agreements similar to, and no less onerous than, the one signed by BIDDER.

3.10 Joint Ventures (association of companies, without legal personality)

Should BIDDER intend to form a Joint Venture (or intend to utilize Subcontractors for major portions of the SERVICES), he shall indicate the names of, and show the allocation of responsibilities for each Joint Venture partner (or Subcontractors).

A BID submitted by a Joint Venture shall comply with the following requirements:

a. The BID shall be signed by all partners so as to be legally binding on each member of the Joint Venture.

b. That the partners of the Joint Venture shall be liable jointly and severally for the performance of the SERVICES.

c. BIDDER’s Bid Form and project technical proposal shall clearly and explicitly state its plans for association with others.

d. Each partner of the Joint Venture is required to provide individually the legal, financial and technical information required in these Instructions to BIDDERS.

3.11 In the event that BIDDER decides during the BID period to form a Joint Venture it shall notify OWNER immediately upon reaching such a decision, and in any event at least ten calendar days prior to the closing date, and provide OWNER with the names of all the Joint Venture partners.

3.12 The BID including all attachments, information, notes, catalogues, and any other written material shall be in English.

3.13 OWNER reserves the right to visit and inspect and satisfy itself regarding the premises, facilities, equipment and other resources of BIDDER and/or any of his proposed subcontractors and to carry out related technical, execution and commercial appraisals prior to entering into any CONTRACT.
3.14 The BID shall remain valid and open for acceptance for 120 day from the closing date; further requests for validity extension are to be expected due to unforeseen delays.

3.15 This project be done on one stage and BIDDER shall submit the technical proposal attached with unpriced commercial proposal.

3.16 OWNER reference numbers must be clearly indicated on the BID and on all letters, communications and other documents related thereto or forming part thereof.

3.17 Information from BIDDER requested in the BID DOCUMENTS shall constitute an essential part of his BID and, in the case of the successful BIDDER, may at OWNER’s discretion, be incorporated as appropriate in any final CONTRACT.

3.18 Should BIDDER find any discrepancies in, or omissions from, the BID DOCUMENTS, or have any enquiries regarding the BID DOCUMENTS, BIDDER shall immediately specify such discrepancies, omissions or enquiries in writing to:

MIDLAND REFINRIES COMPANY
P.O. Box 2075
Baghdad / Iraq
For attention of General Manager - Engineering Department Manager
Telephone (+964 177 50 300)
Fax (+128 1220 1270)
E-mail #1 (daurafax@dauramrc.com)
E-mail #2 (purchase@mrc.oil.gov.iq)
4. **SITE VISIT**

If requested, OWNER shall arrange for BIDDER to visit the plant location to familiarize themselves with the peculiarities of the WORK site before finalizing its BID. OWNER shall provide full details of the date and precise location of such visit, for the purposes of familiarization and the clarification of and replying to any general queries raised by the BIDDER in connection with the tendering requirements. Any number of representatives from each BIDDER shall be accepted. BIDDER shall make all necessary travel arrangements and shall bear all costs associated in connection with the visit.
5. PRESENTATION OF THE BID

The BID shall be divided strictly into the following parts, the contents of which shall be as specified herein:

- SECTION A: containing the TECHNICAL PROPOSAL in one original plus two copies plus one (1) electronic copy on CD ROM sealed in a separate envelope.

- SECTION B: containing the COMMERCIAL PROPOSAL in one original plus two copies and one (1) electronic copy on CD ROM sealed in a separate envelope.

5.1 SECTION A – TECHNICAL PROPOSAL

BIDDERS shall submit technical data, execution plans, procedures and organizational and personnel information as necessary to enable OWNER to fully understand and evaluate BIDDER’S Technical Proposal and to assess their understanding of the BID DOCUMENTS.

The Technical Proposal shall comprise the following:

1. TECHNICAL PROPOSAL
   Based on technical proposal requirement page 35 in this tender document.

2. PROJECT ORGANISATION
   An organization chart showing the BIDDER’S overall organization and functional groups showing lines of authority and communication.

   BIDDER shall provide detailed information concerning the key personnel management organizations and locations proposed for the SERVICES.

   The nominated personnel shall constitute a team comprising of compatible, highly motivated/qualified personnel with the requisite skills.
3. ORGANISATION CHART

BIDDER shall provide a chart identifying BIDDER’S representatives and key personnel dedicated to the performance of the SERVICES. This chart shall highlight the interfaces when part of the SERVICES is executed in different BIDDERS offices. CONTRACTORS intended use of a low cost center should be highlighted in the execution plan.

The organization chart shall be supported by resumes of key personnel outlining their technical qualifications and relevant experiences to manage and supervise the SERVICES.

BIDDER shall identify the contracted personnel, or possible contracted personnel if any with their qualifications.

4. PLANNING AND SCHEDULING

BIDDER shall demonstrate in detail how it proposes to plan, schedule, and monitor and control the SERVICE specified in the BID DOCUMENTS. Unproductive periods such as holidays shall be shown on the schedules.

BIDDER shall prepare and submit the following documents:

- Project Master Schedule. All contract milestone dates and document delivery shall be shown.
- Project Net SERVICE Schedule. BIDDERS shall prepare a list of typical milestones in addition to the contract milestone dates. These milestones cover important events within engineering SERVICE and shall be included in the Project Net SERVICE schedule.
- Progress measurement system including method for measuring and reporting on discipline level.

5. HEALTH, SAFETY AND ENVIRONMENT

- General
  BIDDER shall provide its Health, Safety and Environment policy and procedures applicable to the SERVICES, and more specifically applicable to the location(s) where SERVICES are to be performed.

- Process safety and environment
  The facilities shall be designed so as to be safe, without risk to health and with minimum impact to environment. BIDDER shall define which key regulations, are relevant and how they propose to cope with their duties under those regulations.
6. QUALITY CONTROL

6.1 The bidder should offer third party acting on behalf MRC according to the requirement mentioned in inspection requirement (EXHIBIT 3 in TECHNICAL REQUIREMENTS PART) in this tender.

6.2 Third Party Company should be one of the listed companies in the vendor list (TECHNICAL REQUIREMENTS) in this tender.

6.3 The items of the project which shall be subjected to the third party inspection activities are (furnace, drums, tanks, heat exchangers, air coolers, safety and relief valves, piping and fittings … etc.)

6.4 Technical offer should contain (ITP – inspection test plane) of third party inspection activities per items as mentioned above for (MANUFACTURER SHOP AND MRC SITE), inspection each separately. This ITP should clarify the responsibilities of the manufacturer (contractor) and the third party inspection for each inspection activities maintained in the ITP related to the items subjected to inspection.

6.5 The cost third party inspection shall be 5% (divided to 3% at shop and 2% on MRC site) of the total cost of project and minted as break down price in the commercial offer.

6.6 When the tender is awarded to the bidder the L/C shall be opened with price of project contained the cost of third party inspection.

7. SUBCONTRACTING

If BIDDER intends to subcontract any part of the SERVICES, these should be specified in the BID stating:

The names of subcontractor(s) and address(es),
- Name and position of contact person,
- Their fields of activity,
- Resumes of key personnel to be involved,
- Their previous references in similar projects,
- The SERVICE or part of SERVICE to be subcontracted,
- The terms and conditions of the subcontracts.
8. BIDDER’S OTHER COMMITMENTS

BIDDER shall submit in this section a tabulation showing current and projected SERVICE load at the BID due date and a forecast of SERVICE-load throughout the PROJECT period. All projects shall be individually identified by location and name of client.

9. BIDDER’S PREVIOUS EXPERIENCE

BIDDER shall submit details showing their previous experience on projects of the same or similar nature to the SERVICES, which shall include:

- A description of the SERVICE.
- Location.
- Client.
- Value of Project.
- Date completed.

10. EXCEPTIONS

The BID is required to be made in strict accordance with the technical and execution requirements of the BID DOCUMENTS.

5.2 SECTION B – COMMERCIAL PROPOSAL

The commercial proposal shall be signed by an officer of BIDDER vested with authority to commit BIDDER. BIDDER shall include appropriate evidence as to the authority of the signatory.

The Commercial Proposal shall comprise the following:

1. COVER LETTER AND BID FORM

This section shall contain the BID cover letter written on BIDDER’S letterhead notepaper.

2. BID FORM

This section shall contain the completed Bid Form in accordance with Exhibit 2.

3. PRICE

The contract Price shall be in US DOLLAR.
4. **LEGAL AND FINANCIAL STATUS**

This section shall contain:

- BIDDER’S name.
- Corporate ownership details and legal status, including an outline of organization chart showing the relationship with holding and major associated companies, if any.
- Country of incorporation.
- Country of residence for tax purposes.
- Major activities.
- Names of principal officers.
- Corporate organization charts.
- Bank references.
- Financial reports for the last three years.
- Statement that BIDDER is familiar with all government and local regulations.
- Details of any outstanding or potential litigation against BIDDER which could have an adverse impact on the performance of the SERVICES.
- Details of any outstanding indebtedness or unsecured loans or debts or trading losses not reported within the financial reports.

5. **JOINT VENTURE**

If applicable, this section shall contain the Joint Venture statements described above.

6. **ALTERNATIVE**

BIDDER shall submit in the format of the following tabulation the impact of any alternatives proposed by BIDDER, clearly cross-referenced to the items within Section B technical alternatives of the BID.

<table>
<thead>
<tr>
<th>Item ref.</th>
<th>Description</th>
<th>Recommended change</th>
<th>Reasons for proposed alternative</th>
<th>Impact on the base BID should owner accept alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Price</td>
</tr>
</tbody>
</table>

Lump sum price shall be quoted to avoid any misinterpretation.

7. **EXCEPTION**

BIDDERS shall submit a BID in full compliance with the BID DOCUMENTS.
8. OPTIONS

BIDDERS shall quote for any options that might be of value to OWNER with supporting criteria and relevant references in a separate submission.

9. CONTRACT PRICE

CONTRACT PRICE for CONTRACTOR'S SERVICE shall be quoted on lump sum (LS) basis, taking in consideration all possible extra costs that might arise due to time delays prior to Award date plus delays that might be encountered pre contract. Banking delays are inevitable and BIDDER shall take the measures that would secure minimum negative impacts on the LS price quoted, further appeals for price amendment are not encouraged and are almost invariably refused.

Failure to achieve that shall subject the offer to refusal in accordance with the prevailing ordinance mandated by the Iraq Ministry of Oil (This point not applicable in this tender document).
6. **SUBMISSION OF BID**

6.1 BIDDER shall submit the BID as follows:

The original Commercial Proposal plus two (2) copies thereof, plus one (1) electronic copy on CD ROM and the original Technical Proposal plus two (2) copies, plus one (1) electronic copy on CD ROM. Each proposal shall be enclosed in a separate sealed package and forwarded to:

MIDLAND REFINRIES COMPANY  
P.O. Box 2075  
Baghdad / Iraq  
For attention of General Manager - Engineering Department Manager

Telephone (+964 177 50 300)  
Fax (+128 1220 1270)  
E-mail #1 (daurafax@dauramrc.com)  
E-mail #2 (purchase@mrc.oil.gov.iq)

6.2 BIDDER shall be responsible for delivering its BIDS at OWNER'S office specified above on or before the closing time and date of submission stated in the letter of invitation, carefully packed and wax-sealed and bearing the proper identification markings. Delivery of the BID, and any other documents, shall be at BIDDER's cost including all transportation and insurance costs.

6.3 BIDS delivered after the time closing date, shall be returned unopened. Accordingly, BIDDER shall be responsible for obtaining from OWNER a receipt for delivery of its BIDS as without this receipt no claim in respect of the foregoing arising from late or partial delivery shall be considered.
7. **BID EVALUATION**

7.1 OWNER intends to perform the evaluation of the BIDS at its offices in 12 weeks or little more. The evaluation shall be conducted in two (2) phases, being technical and commercial.

7.2 If deemed necessary by OWNER clarification meetings may be held with one or more BIDDER after receipt of the BIDS. However, the principles of competitive bidding shall be strictly maintained.

7.3 The basic principle of BID evaluation shall be to evaluate each Bid in its entirety paying due regard to all the evaluation criteria, but in particular to BIDDERS:

- Demonstration of commitment to project objectives
- Demonstration of capabilities and competences to handle the project scope of SERVICE and related technical challenges and guarantees
- The organization and resources proposed.
- The proposed structured SERVICE-process for (process, engineering, project control)
- Contractual and commercial criteria.

From this end the BIDDER according to the following

<table>
<thead>
<tr>
<th>weight in point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical offer</td>
</tr>
<tr>
<td>Commercial offer</td>
</tr>
</tbody>
</table>

**A / Technical offer 70%**

1. Previous Experience with similar project | 15%
2. Equipment vendors & origin | 10%
3. Quality control and inspection material | 10%
4. Project period | 10%
5. Guarantee &wantee | 10%
6. Process & performance | 10%
7. HSE plant | 5%

**B / Commercial offer 30%**

1. Financial strength of the bidder | 10%
2. Payment terms | 20%
EXHIBIT 1

DELIVERY OF BID

TECHNICAL PROPOSAL
The Technical Proposal shall be contained in sealed packages marked:

“Technical Proposal for HEAVY PRODUCTS TRUCKS LOADING STATION – TURN KEY PROJECT"

An original plus 2 copy of the Technical Proposal is required. Each copy shall be individually wrapped and sealed. The original shall be separately packed and clearly marked “ORIGINAL”. In addition one (1) electronic copy on CD ROM shall be supplied, wrapped and sealed.

Each volume of each copy i.e. not the “ORIGINAL”, shall be clearly marked by the number of the copy, i.e., “COPY (number). Volume numbers shall be clearly marked if there is more than one volume to a particular proposal. All identification shall be clearly marked on all the proposals and the sealed packages.

COMMERCIAL PROPOSAL
The Commercial Proposal shall be contained in sealed packages marked:

“Commercial Proposal for HEAVY PRODUCTS TRUCKS LOADING STATION – TURN KEY PROJECT"

An original plus 2 copy are required. Each copy shall be individually wrapped and sealed. The original shall be separately packed and clearly marked “ORIGINAL”. In addition one (1) electronic copy on CD ROM shall be supplied, wrapped and sealed.

Each volume of each copy, i.e., not the “ORIGINAL”, shall be clearly marked by the number of the copy, i.e., “COPY (number). Volume numbers shall be clearly marked if there is more than one volume to a particular proposal. All identification shall be clearly marked on all the proposals and the sealed packages.
EXHIBIT 2

BID FORM

(To be included in the Commercial Proposal)

To: Midland Refineries Company
   PO Box 2075
   BAGHDAD / IRAQ
   For the Attention of General Manager – Engineering Department Manager.

Subject: INVITATION TO BID NO. (3593 / 2015) FOR EPC of HEAVY PRODUCTS TRUCKS LOADING STATION.

1. Having examined and noted the BID DOCUMENTS, i.e.:
   - The Instructions to BIDDERS
   - The Technical Requirements
   - The Contractor Commitments
   - All Related Addenda

   We undertake to complete the WORK and perform all SERVICES and obligations described in the BID DOCUMENTS in accordance with the contractual dates stated in and forming part of the Technical Proposal, for the rates in accordance with the terms and conditions set forth in the BID DOCUMENTS.

2. We acknowledge receipt of the following addenda to the TENDER DOCUMENTS issued by OWNER during the BID period: ………………. and have taken the content of these addenda into account in making this offer.

3. We agree to keep this offer open till ……………. from the closing date and it shall remain binding upon us and may be accepted by OWNER at any time before the expiration of such period.

4. If this offer is accepted within the period of time mentioned in the foregoing provision, we agree to enter into a formal agreement to perform the SERVICE in accordance with the AGREEMENT and the Exhibits listed herein above.
5. We understand that you are not bound to accept the lowest or any offer you may receive; we agree that your decision shall not be contested or opposed by us, and that the submission of this offer does not involve OWNER incurring any costs whatsoever.

Dated the day of

Signature in the capacity of

Witness:
Occupation:
Address:
EXHIBIT 3

CONTRACT PRICE BREAKDOWN

1. BIDDER shall state his Contract Price, being a Lump Sum price for the whole of his WORK and SERVICEs specified in this Invitation to Bid. Such price shall be fixed and firm, and shall not be subject to adjustment by reference to any currency exchange rates or cost indices.

2. BIDDER shall propose a schedule of payments for fixed percentages of this lump sum price against Project Milestones subject to approval by OWNER.

3. Bidders are requested to offer a break down price for the following items;

A. Engineering design (Basic and detailed engineering).
B. Procurement, fabrication and supply of equipment and materials – CIP BAGHDAD / DAURA refinery site.
C. Civil works supervision
D. Site construction and erection inside project battery limit (loading area, pumping house area No.1 & No.2 and hot oil system area)
E. Supervision of construction, pre-commissioning, commissioning and start-up activities.
F. Third party inspection (at manufacturer shop and MRC site).
G. Specific training of DAURA refinery personnel.
H. Scope of supply must include equipment and materials to be quoted on unit price basis.
HEAVY PRODUCTS TRUCKS LOADING STATION

TECHNICAL REQUIREMENTS
# TECHNICAL REQUIREMENTS

## HEAVY PRODUCTS TRUCKS LOADING STATION

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<td>39 / 106</td>
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</tbody>
</table>
1. **INTRODUCTION**

MIDLAND REFINRIES COMPANY intend to design and construct a new HPTLS to service all lube oil board trucks loading activities at DAURA REFINERY site / IRAQ.

2. **PROJECT SCOPE OF WORK**

According to simplified process flow sheet and station layout drawing (as shown in EXHIBITS 1A & 1B) the project scope of work is:

<table>
<thead>
<tr>
<th>REQUIREMENTS</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. TRUCKS LOADING ACTIVITIES1,2</td>
<td></td>
</tr>
<tr>
<td>1. BLOWN ASPHALT LOADING TERMINALS</td>
<td>2</td>
</tr>
<tr>
<td>2. BLEND ASPHALT LOADING TERMINALS</td>
<td>3</td>
</tr>
<tr>
<td>3. VACUUM RESIDUE LOADING TERMINALS</td>
<td>3</td>
</tr>
<tr>
<td>4. EXTRACT MIX LOADING TERMINAL</td>
<td>1</td>
</tr>
<tr>
<td>5. WAXES LOADING TERMINALS</td>
<td>1</td>
</tr>
<tr>
<td>6. LUBRICANTS LOADING TERMINALS</td>
<td>6</td>
</tr>
<tr>
<td>7. BASE OIL LOADING TERMINALS</td>
<td>3</td>
</tr>
<tr>
<td>B. BLOWN ASPHALT BARREL FILLING POINTS</td>
<td>4</td>
</tr>
<tr>
<td>C. PUMPING HOUSES3,4</td>
<td>2</td>
</tr>
<tr>
<td>D. HOT OIL SYSTEM</td>
<td>1</td>
</tr>
<tr>
<td>E. CONTROL AND ELECTRICAL STATION</td>
<td>1</td>
</tr>
<tr>
<td>F. PIPING WORK</td>
<td>LOT</td>
</tr>
<tr>
<td>G. DRAINING COLLECTING SYSTEM5</td>
<td>2</td>
</tr>
</tbody>
</table>

**REMARKS**

1. Each loading terminals should be served by individual pump which should be in scope of supply.
2. Blown asphalt pumps served both asphalt loading terminals and barrel filling activities (each pump served one asphalt loading terminals plus 2 barrel filling points).
3. The station should be designed with extra 3 (loading terminals and served pumps) for future expansion purposes.
4. First pumping house includes pumps for items 1 to 4, while second pumping house includes pumps for items 5 to 7 (as mentioned in point (a) above).
5. This system includes 2 pits, 2 sump drums and 2 sump pumps with all necessary accessories for ease operation and controlling activities.
3. DESIGN BASIS AND DESIGN CAPACITY

3.1 Loading and filling activities

The station facilities should be designed to cover the following requirements:

1. Blown and Blend asphalt loading capacity should be 70m³/hr, asphalt loading should be furnished with mini circulation line connected between product pumps and storage tanks.

2. Other products loading capacity should be 50m³/hr.

3. The loading system includes computer, computer – automated controls and automated data recording.

4. The automated controls provide remote operation for all loading pumps which they located near the storage tanks area. The load – out controls for each load – out arm incorporates lockouts to prevent operation of the pumps unless the arm is properly positioned and valves are properly set.

5. The system should include an overflow device that automatically shuts off the loading activities in case the scales fail to do so when a preset limit is reached.

6. Valves for tanks that supply any kind of product listed above to the loading arms are manually preset by terminal operators. Tank truck drivers have no direct control over tank valves.

7. Loading arms should be meet the following requirements:

   A. Arms that service vacuum residue, blown asphalt, blend asphalt, extract, base oil 150 and waxes loading should be designed to be incorporated with steam jacket or electrical heater.

   B. Top loading of tank trucks can be achieved through open manlid loading.

   C. The type of loading arm should be determining the necessary distance to reach the farthest compartment to be loaded without re-spotting the transport.

   D. Each loading arms should be integrated with suitable metering skid.

   E. A properly balanced loading arm (hydraulic type prefer) will allow the operator to effortlessly and safely move the arm into and out of the loading position.

8. Barrel filling activities

The station filling facilities should be designed to cover the following requirements:

   A. Filling activities should be done through four filling points:

       Worker places drums at the filling location then move the filling flexible house to the barrel then open the filling isolating valve manually and start barrel filling, worker visually check that fill of products then close the filling isolating valve and move the barrel.

   B. Batch filling:

       • Each batch include 2 barrel with 200lit of capacity
       • Batch filling time not more than 3min this doesn't include barrel loading/unloading.
       • 4 extra filling points with all accessories should be in scope of supply.
3.2 Pumping houses

The station include 2 pumping house (as shown in project layout EXHIBIT 1B) each house should contain the following pumps:

<table>
<thead>
<tr>
<th>NO1</th>
<th>PUMPING HOUSE</th>
<th>TYPE &amp; QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>BLOWN ASPHALT LOADING PUMPS</td>
<td>SECRW X 2</td>
</tr>
<tr>
<td>2.</td>
<td>BLEND ASPHALT LOADING PUMPS</td>
<td>CENTRIFUGAL X 3</td>
</tr>
<tr>
<td>3.</td>
<td>VACUUM RESIDUE LOADING PUMPS</td>
<td>CENTRIFUGAL X 3</td>
</tr>
<tr>
<td>4.</td>
<td>EXTRACT MIX LOADING PUMPS</td>
<td>CENTRIFUGAL X 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NO2</th>
<th>PUMPING HOUSE</th>
<th>TYPE &amp; QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>WAXES LOADING PUMPS</td>
<td>CENTRIFUGAL X 1</td>
</tr>
<tr>
<td>2.</td>
<td>LUBRICANTS LOADING PUMPS</td>
<td>CENTRIFUGAL X 6</td>
</tr>
<tr>
<td>3.</td>
<td>BASE OIL PUMPS</td>
<td>CENTRIFUGAL X 3</td>
</tr>
</tbody>
</table>

3.3 Hot oil system

The station integrated with hot oil system to supply new product tanks (asphalt tank) with all necessary heat to keep the asphalt product pumpable, this system should be designed to meet the following requirements:

3.3.1 Supplying the new product tanks with all necessary heat to keep asphalt product within pumpable temperature limits (180 – 200°C).

**Notes**

A. According to DAURA practical experience the minimum asphalt pumping temp. Should be not less than 190°C.

B. Note 2: The project consisting of two product tanks with capacity equal to 1500m$^3$ and 1000m$^3$, these tanks does not included in the scope of work (see Exhibit 1B)

C. The hot oil pipes should be tie in with new product tanks coils.

D. Hot oil system equipment supply and construction activities shall to submit in separated price.

3.3.2 The hot oil system should be designed to use SAE-30 distillate produced in DAURA REFINERY as heat transfer fluid. Any other kind of hot oil fluid considered by bidders should be subject to DAURA refinery approval.

3.3.3 Hot oil system location will be decided in later stage (during kick of meeting), to be note that hot oil furnace area classified according to zone 0, the contractor should take this limits in the design for safety purpose.
3.4 Piping work

3.4.1 OSBL

Contractor should be responsible for design, material, supply, erection & construction work of project piping net outside battery limit.

OSBL piping net include but not limited to the following:

1. Piping net from existing units or storage facilities to the new station storage tanks this include steam tracing and piping insulation where ever need.
2. Hot oil transfer pipe from existing unit or storage tanks to hot oil system this include piping insulation.
3. New storage tanks heat supply piping net (steam piping from existing steam header to new storage tanks) this include piping insulation.
4. Piping net from the new station storage tanks to station pumps this include steam tracing and piping insulation where ever need.
5. Piping net from station pumps to loading and filling facilities this include piping steam tracing and piping insulation where ever need.
6. Piping net between hot oil system and new blown asphalt storage tanks this includes piping insulation.
7. Connecting piping between sump pumps and existing refinery slop oil tanks piping net this include steam tracing and piping insulation.
8. Fire fighting net inside loading area, this includes connection with the existing refinery fire fighting pipe header.

3.4.2 ISBL

Contractor should take the responsibilities for the entire project piping work inside project battery limit, (inside loading area and hot oil system area) which include process, utility and fire fighting piping and system.

3.5 Draining collecting system

The station should corporate two drainage systems collecting net according to project layout as shown in EXHIBIT 1B (AREA A, C).

Each system should contain pit and sump drum. All water drains during normal operation, maintenance & inspections operations and water rain should be collected in the pit. While all hydrocarbons drains during normal operation, maintenance & inspection operations and others should be collected in the sump drum.

Sump drum content should be pumped to the existing slop oil tanks by a vertical centrifugal pump fixed on the sump drum.
3.6 Project buildings and civil works

Contractor should be responsible for the whole civil activities this include civil design, material supply and civil construction work.

Project civil include but not limited to the following items;

1. Electrical sub-station and Station management and control building
   Area of building should be not less than 400m² divided by 2 floors
   • According to the project layout drawing (EXHIBIT 1B) the electrical sub-station should serve all the station activities which include but not limiting to trucks loading, barrel filling, hot oil system as well as all lighting for storage tanks area No.1 & No.2.
   • According to the project layout drawing (EXHIBIT 1B) the station management and control should contain, control room, four operator room, two WC, kitchen, store and trucks driver rest room.

2. All power and instrumentation cables installation work (civil and extension work).

3. All civil work relating with equipment foundation, piping work mentioned in point 3.5 and steel structure installation (to be note that steel structure material supply under contractor responsibilities)

4. All civil work relating with draining collecting system and hot oil system as mentioned in points 3.6 and 3.4 respectively.

5. All civil work relating with fire fighting piping net.

3.7 Project layout

According to the site layout (as shown in EXHIBIT 2B) the project facilities must be distributed into the following parts:

<table>
<thead>
<tr>
<th>AREA</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A – AREA</td>
<td>Loading, barrels filling and control room area</td>
</tr>
<tr>
<td>B – AREA</td>
<td>Storage area #1 and pumping house area #1</td>
</tr>
<tr>
<td>C - AREA</td>
<td>Storage area #2, hot oil system, electrical sub-station and pumping house area #2</td>
</tr>
</tbody>
</table>
### 3.8 Products specification

**Tanks No.**

<table>
<thead>
<tr>
<th>Products</th>
<th>73</th>
<th>74</th>
<th>75</th>
<th>66</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity, C.St. @ 40°C</td>
<td>(2)</td>
<td>(2)</td>
<td>(2)</td>
<td>NA</td>
</tr>
<tr>
<td>Viscosity, C.St. @ 100°C</td>
<td>3 – 5</td>
<td>8.5 – 12.5</td>
<td>28 – 32</td>
<td>16.11 – 24</td>
</tr>
<tr>
<td>Viscosity, C.St. @ 140°C</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Viscosity, C.St. @ 200°C</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Sp.gr @ 15.6°C</td>
<td>27 – 33</td>
<td>22 – 25</td>
<td>18 – 23</td>
<td>7.22 – 22.3</td>
</tr>
<tr>
<td>Pour Point, °C</td>
<td>-9 to -12</td>
<td>-9 to -12</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Flash Point, °C</td>
<td>180 – 195</td>
<td>225 – 235</td>
<td>225 – 245</td>
<td>NA</td>
</tr>
<tr>
<td>Penetration @ 25°C</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Soft Point, °C</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Ductility cm @ 25°C</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Sulfur, wt%</td>
<td>0.6 – 0.9</td>
<td>0.85 – 1.0</td>
<td>1.4 – 1.7</td>
<td>NA</td>
</tr>
<tr>
<td>Storage Tanks Temp., °C</td>
<td>15 – 50</td>
<td>15 – 50</td>
<td>40 – 60</td>
<td>65 – 75</td>
</tr>
</tbody>
</table>

**Tanks No.**

<table>
<thead>
<tr>
<th>Products</th>
<th>71</th>
<th>2308A</th>
<th>31-13-44-47</th>
<th>72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity, C.St. @ 40°C</td>
<td>(2)</td>
<td>NA</td>
<td>NA</td>
<td>(2)</td>
</tr>
<tr>
<td>Viscosity, C.St. @ 100°C</td>
<td>13 – 18</td>
<td>Min. 500</td>
<td>4 – 16</td>
<td>2.5 – 3.2</td>
</tr>
<tr>
<td>Viscosity, C.St. @ 140°C</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Viscosity, C.St. @ 200°C</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Sp.gr @ 15.6°C</td>
<td>0.89 – 0.9</td>
<td>1.01 – 1.02</td>
<td>35 – 49</td>
<td>0.79 – 0.85</td>
</tr>
<tr>
<td>Pour Point, °C</td>
<td>-12</td>
<td>NA</td>
<td>NA</td>
<td>-20 to -30</td>
</tr>
<tr>
<td>Flash Point, °C</td>
<td>220 – 240</td>
<td>NA</td>
<td>NA</td>
<td>Min. 140</td>
</tr>
<tr>
<td>Penetration @ 25°C</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Soft Point, °C</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Ductility cm @ 25°C</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Sulfur, wt%</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Storage Tanks Temp., °C</td>
<td>15 – 50</td>
<td>125 – 150</td>
<td>65 – 75</td>
<td>15 – 50</td>
</tr>
</tbody>
</table>

**Tanks No.**

<table>
<thead>
<tr>
<th>Products</th>
<th>61-52-63</th>
<th>54-56-57</th>
<th>2308C</th>
<th>2308B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity, C.St. @ 40°C</td>
<td>(2)</td>
<td>(2)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Viscosity, C.St. @ 100°C</td>
<td>13 – 18</td>
<td>3 – 12</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Viscosity, C.St. @ 140°C</td>
<td>NA</td>
<td>NA</td>
<td>500 to 650</td>
<td>NA</td>
</tr>
<tr>
<td>Viscosity, C.St. @ 200°C</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Sp.gr @ 15.6°C</td>
<td>0.89 – 0.9</td>
<td>0.88 – 0.9</td>
<td>1.0 – 1.1</td>
<td>1.02 – 1.04</td>
</tr>
<tr>
<td>Pour Point, °C</td>
<td>-12</td>
<td>-12 – 15</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Flash Point, °C</td>
<td>220 – 240</td>
<td>170 – 230</td>
<td>240 – 300</td>
<td>Min. 240</td>
</tr>
<tr>
<td>Penetration @ 25°C</td>
<td>NA</td>
<td>NA</td>
<td>20 – 30</td>
<td>40 – 50</td>
</tr>
<tr>
<td>Soft Point, °C</td>
<td>NA</td>
<td>NA</td>
<td>80 – 90</td>
<td>49 – 58</td>
</tr>
<tr>
<td>Ductility cm @ 25°C</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td>Sulfur, wt%</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Storage Tanks Temp., °C</td>
<td>15 – 50</td>
<td>15 – 50</td>
<td>185 – 195</td>
<td>145 – 165</td>
</tr>
<tr>
<td>Tanks No.</td>
<td>70</td>
<td>59-60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>--------</td>
<td>--------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity, C.St. @ 40°C</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity, C.St. @ 100°C</td>
<td>15 - 35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity, C.St. @ 140°C</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity, C.St. @ 200°C</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sp.gr @ 15.6°C</td>
<td>0.86 - 0.9</td>
<td>0.89 - 0.91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pour Point, °C</td>
<td>-12 to -15</td>
<td>-12 to -15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash Point, °C</td>
<td>170 - 230</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penetration @ 25°C</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft Point, °C</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ductility cm @ 25°C</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfur, wt%</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage Tanks Temp., °C</td>
<td>15 - 50</td>
<td>15 - 50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. **DESIGN REQUIREMENTS**

The following requirements should be considered in the station design

4.1 Station design

A. The station shall be designed to be completely modular skid mounted with all components, accessories and interconnecting piping to minimize on-site erection time.

B. The station shall be designed to be highly automated allowing adjusting all loading and filling activities from central controlling room.

4.2 Safety and emergency shutdown systems

Safety and shutdown systems shall be in accordance with the requirements of applicable standards. This shall include (but not limiting) to the following cases:

A. Process upsets caused by loss of feed or utilities.

B. Risk of fire in controlling room, electrical substation, loading area...etc.

C. Electrical power or controlling system failure.

4.3 Start up and shut down

Maximum secure of safety for the station and personnel shall be embodied wherever applicable

4.4 Equipment design margins

In general, a 10% margin shall be employed for all equipment
5. **UTILITIES AND UNIT BATTERY LIMIT CONDITIONS**

Products are available direct from new product tanks (point 3.9 above) showing each product condition at unit BL. Conditions and specification of the supplied utilities (by MRC) are listed in tables below.

<table>
<thead>
<tr>
<th>SUPPLY HP AND LP STEAM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High pressure steam</strong></td>
<td><strong>Low pressure steam</strong></td>
</tr>
<tr>
<td>Pressure (min./nor./max.), bar(_g)</td>
<td>16/18/19</td>
</tr>
<tr>
<td>Temperature (min./nor./max.), °C</td>
<td>230/240/255</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COOLING WATER</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbidity (max.), NTU</td>
<td>20</td>
</tr>
<tr>
<td>Chlorides (max.), ppmw</td>
<td>500</td>
</tr>
<tr>
<td>Supply temperature (min./nor./max.)</td>
<td>25/28/32</td>
</tr>
<tr>
<td>Supply Pressure (min./nor./max.), bar(_g)</td>
<td>2.5/3.0/3.5</td>
</tr>
<tr>
<td>Return pressure (min./nor./max.), bar(_g)</td>
<td>1.0/1.5/2.0</td>
</tr>
<tr>
<td>Fouling resistance, ((m^2 \cdot hr. °C/kcal))</td>
<td>0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INSTRUMENT AIR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtered, dry and oil free</td>
<td></td>
</tr>
<tr>
<td>Particle size (per ISA-S7.3) (max.), micron</td>
<td>3</td>
</tr>
<tr>
<td>Dew point (max.), °C</td>
<td>-10°C</td>
</tr>
<tr>
<td>Supply temperature, °C</td>
<td>AMB</td>
</tr>
<tr>
<td>Supply pressure (min./nor./max.), bar(_g)</td>
<td>3.0/4.0/7.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FUEL OIL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature °C</td>
<td>90 – 95</td>
</tr>
<tr>
<td>Pressure Kg/cm(^2).g</td>
<td>11.5 – 12.5</td>
</tr>
<tr>
<td>API gravity @ 15.4°C</td>
<td>16 – 17.5</td>
</tr>
<tr>
<td>Viscosity, C.S. @ 98.9°C</td>
<td>33 – 38</td>
</tr>
<tr>
<td>LHV, Kcal/kg</td>
<td>9180 – 9780</td>
</tr>
<tr>
<td>Sulfur, wt%</td>
<td>3.9 – 4.05</td>
</tr>
<tr>
<td>Nickel, ppm</td>
<td>24 – 26</td>
</tr>
<tr>
<td>Vanadium, ppm</td>
<td>55 – 58</td>
</tr>
</tbody>
</table>
6. **PROCESS GUARANTEES**

The complete definitive guarantee shall be provided in the guarantee agreement. The minimum scope shall include the following:

6.1 Performance guarantee

Bidder should be responsible of performance guarantees of loading and filling capacity and hot oil system heat supply.

6.2 Mechanical guarantee

A. Bidder should be responsible of the mechanical performance of equipment and material for a period of 18 months from the date of issuance the provisional acceptance certificate.

B. Design life for the equipment should be 25 years
7. **TECHNICAL PROPOSAL**

Technical proposal shall give the definition of the supply of engineering, equipment and material, training of personnel, construction, pre-commissioning and commissioning, construction supervision and startup supervision activities required by MRC for implementation of the HPTLS to be located in DAURA refinery – Baghdad.

The bidder shall verify the status of sufficient information of technical proposal which include (but not limiting) the following items.

7.1 **DESIGN BASIS**  
7.2 **UNIT DESCRIPTION AND FLOW SCHEME**  
7.3 **DESIGN FEATURES**  
7.4 **EQUIPMENT LIST AND EQUIPMENTS CHARACTERISTICS.**  
7.5 **STATION PLOT PLAN AND BATTERY LIMIT**  
7.6 **INSTRUMENT AND CONTROLLING SYSTEM**  
7.7 **SAFETY SHUTDOWN SYSTEMS**  
7.8 **PROCESS GUARANTEES**  
7.9 **CODES AND STANDARDS**  
7.10 **VENDOR LIST**  
7.11 **SCOPE OF WORK (this will include the following)**

A. **BASIC AND DETAIL ENGINEERING, HAZOP AND APPROVAL MEETING**
B. **PROCUREMENT AND EXPEDITING SERVICES**
C. **PROJECT DOCUMENTATION**
D. **INSPECTION REQUIREMENT AND INSPECTION TEST PLAN**
E. **SUPPLY OF EQUIPMENT AND MATERIAL**
   - **ITEMIZED EQUIPMENT**
   - **PIPING MATERIAL, INSULATION AND PAINTING**
   - **INSTRUMENTATION AND AUTOMATION**
   - **ELECTRICAL SYSTEM**
   - **FIRE FIGHTING**
   - **TWO YEARS OPERATION SPAREPARTS**
   - **PACKING OF EQUIPMENT AND MATERIAL**
   - **CIVIL REQUIREMENT**
F. TRAINING OF PERSONNEL
G. CONSTRUCTION AND ERCTION WORK
H. SUPERVISION OF CIVIL WORKS, PRE-COMMISSIONING, COMMISSIONING AND START-UP ACTIVITIES
I. PROJECT SCHEDULE AND PROJECT ORGANIZATION
   • PROJECT TIME SCHEDULE
   • PROJECT ORGANIZATION
   • DOCUMENT CONTROL
EXHIBIT 1A

Simplified Process Flow Sheet

To be submitted later after bidder site visit
EXHIBIT 1B

PROJECT PLAN LAYOUT

TO BE SUBMITTED LATER AFTER BIDDER SITE VISIT
EXHIBIT 3
BASIC ENGINEERING DESIGN DATA

Client MRC
Project Title HEAVY PRODUCTS TRUCKS LOADING STATION
Project Location DAURA REFINERY / BAGHDAD

1. PROJECT INFORMATION

Client Midland Refineries Company (MRC)
Plant Name HEAVY PRODUCTS TRUCKS LOADING STATION
Plant Location DAURA REFINERY, BAGHDAD / IRAQ

2. APPLICABLE CODES, STANDARDS AND REGULATIONS

Design and construction shall conform to the latest edition of the following basic codes and/or regulations:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CODE &amp; STANDARD</th>
<th>ITEM</th>
<th>CODE &amp; STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Vessels</td>
<td>ASME</td>
<td>Fire Protection</td>
<td>NFPA</td>
</tr>
<tr>
<td>Building</td>
<td>BS</td>
<td>Piping</td>
<td>ASME, ANSI</td>
</tr>
<tr>
<td>Structural</td>
<td>AISC</td>
<td>Concrete</td>
<td>ACI</td>
</tr>
<tr>
<td>Electrical</td>
<td>IEC, NEMA</td>
<td>Materials</td>
<td>ASTM NOTE 1</td>
</tr>
<tr>
<td>Sanitary</td>
<td>BS, API</td>
<td>Mechanical</td>
<td>API</td>
</tr>
<tr>
<td>Safety</td>
<td>BS, NFPA</td>
<td>Welding</td>
<td>ASME, AWS</td>
</tr>
<tr>
<td>Water Pollution</td>
<td>EPA</td>
<td>Heat Exchangers</td>
<td>TEMA, Class R</td>
</tr>
<tr>
<td>Air Pollution</td>
<td>EPA</td>
<td>Tanks</td>
<td>API</td>
</tr>
<tr>
<td>Noise</td>
<td>OSHA</td>
<td>Burners</td>
<td>API</td>
</tr>
<tr>
<td>Process Heaters</td>
<td>API, ASME</td>
<td>Instrument</td>
<td>ISA</td>
</tr>
<tr>
<td>Safety Valves</td>
<td>ASME, API</td>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

NOTE 1 With conformance to ASME requirements
NOTE 2 As recommended by contractor and approved by client (MRC)
3. The system of measurements shall be MKS
4. Pipe diameters shall be in inches
3. CLIMATIC DATA

3.1 Wind

a. Maximum hourly velocity 155 Km/hr
b. Direction prevailing north west
c. Wind Loading the basic wind speed to be used
   For structural design shall be 44.4m/s for
   50 year recurrence

3.2 Air temperature

d. Maximum recorded 55°C
e. Minimum recorded -8°C
f. Average max monthly 34.6°C
g. Average min monthly 9.4°C
h. Design maximum 55°C
i. Design minimum -8°C
j. Design wet bulb 28°C

3.3 Relative humidity

k. Summer mean (months) 50%
l. Winter mean (months) 25%
m. Design maximum 90%
n. Design minimum 12%

3.4 Rainfall

o. Average annual 154.8mm
p. Maximum recorded in 1 Hr 150mm
q. Maximum recorded in 24 Hrs 70mm

3.5 Snowfall

r. Maximum recorded depth
s. Maximum recorded snowfall None
t. Design snow loading

3.6 Barometric pressure
3.7 Solar Heat

x. Mid-day Solar heat flux, maximum 1200W/m²

3.8 Atmosphere

y. Extreme moisture (tropical climate)
z. Sand storms (Bimonthly)
aa. Exposure to other pollutants originating from surrounding industrial plant (normal flue gases coming off refinery chimneys (SOx, NOx) & flares)

3.9 Miscellaneous Site Data

bb. Thunderstorm Frequency / During Winter months (Dec.- April) sometimes quite intense
cc. Sandstorm frequency/ Bimonthly, sometimes extending few days

3.10 Seismic zone

Seismic importance factor 1.25, earth quick calculation shall be in accordance with UPC-1997.
4. PROJECT EQUIPMENT REQUIREMENTS

4.1 PRESSURE VESSELS AND TANKAGE

- Welded unfired pressure vessels (ASME sec. VIII Division 1/2001 revision) for design and fabrication
- Tankage (API 650 of latest revision) for design shall apply

4.2 HEAT TRANSFER EQUIPMENT

In case of conflict in the Codes and Standards, the most stringent requirements shall apply

A. Shell and tube exchangers

Shell and Tube exchangers shall be designed in accordance with

1. TEMA Class R & ASME section VIII of latest revision
2. API (640, 661) of latest revision
3. ASME sections (V,IX) of latest revision

Remarks:

The maximum preferred tube lengths shall be 6000mm
The limitation on removable bundle diameter shall be 1000mm
The limitation on fixed bundle diameter shall be 1000mm
The preferred tube pitch shall be with minimum clearance between tubes of 0.25in
For dirty tubes service tubes arrangement shall be square type, else all tubes arrangement types are acceptable (for clean service)

<table>
<thead>
<tr>
<th>Preferred tube size</th>
<th>Size (inch) and gage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Steel</strong></td>
<td>OD (inch)</td>
</tr>
<tr>
<td></td>
<td>BWG (min)</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Alloy steel</strong></td>
<td>OD (inch)</td>
</tr>
<tr>
<td></td>
<td>BWG (min)</td>
</tr>
<tr>
<td><strong>Copper alloy</strong></td>
<td>OD (inch)</td>
</tr>
<tr>
<td></td>
<td>BWG (min)</td>
</tr>
</tbody>
</table>
B. Fired Heaters

Fired Heaters shall be designed in accordance with

1. ASME section VIII division 1 of latest revision
2. ASME sections (I, II, V, IX) of latest revision
3. API 530 of latest revision
4. ANSI B31.3 of latest revision

Remarks

Heaters shall be equipped with combination burners

Pilot burners shall be provided for each burner

The minimum efficiency to be considered minimum 85%

The minimum stack height required above grade line is 12m taking in to consideration environmental regulation

The stack type shall be flanged segment and internally lined with suitable refractory

Air heaters shall be provided

Soot blowers, provision for future soot blowers shall be provided

Burners shall be designed for dual firing (gas & liquid) and with minimum thermal efficiency of 85%

Snuffing steam shall be in accordance with API recommended practice
4.3 ROTATING EQUIPMENT

A. Centrifugal pumps

The pump shall be manufactured and tested in accordance with

1. API 610
2. API 682 (for mechanical seal)
3. Pump shall be furnished with (JOHN CRANE – EAGLE BURGMANN – FLOWSERVE) mechanical seal

Remarks

Pump shall be in continuous service, heavy duty and easy maintaining

The pump should be supplied with electrical motor and base plate

Bearing shall be antifriction ball bearing, ring lubricated

Centrifugal cantilever pump shall be labyrinth sealing type for bearing housing

Pump shall be furnished with flexible membrane type with spacer coupling balanced between pump and motor.

Non-sparking coupling guard

Single mechanical seal will be preferable

Fabricated steel base plate

Centerline case mounting

Flange pump drains

Coupling shall be removable without disturbing the other equipment

Motor power shall be 20% more than the maximum power of the pump

Pump speed shall be limited to 3000rpm (less than 3000 rpm is preferable)

The pump NPSHa shall be more that NPSHr by suitable margin (at least 1 meter)

Material code for pumps should be C6 or A8

Bearing housing should be equipped with adequate cooling water which meets the cooling water specifications that mentioned previously in this tender
B. Screw pumps

The pump shall be manufactured and tested in accordance with

1. API 676
2. API 682 (for mechanical seal)
3. Pump shall be furnished with (JOHN CRANE – EAGLE BURGMANN – FLOWSERVE) mechanical seal

Remarks

Pump shall be in continuous service, heavy duty and easy maintaining
Pump should be equipped with relief valve, mounted on the pump
Flexible membrane spacer type coupling between pump and electrical motor dynamically balanced
Non-sparking coupling guard
Fabricated steel base plate
Pump should be furnished with heating steam jacket
Motor power shall be 20% more than the maximum power of the pump
The pump NPSHa shall be more than NPSHr by suitable margin (at least 1 meter)
Pump speed shall be no more than 1500 rpm
Screw pump should be triplex screw type
Screw pump should be furnished with replicable liner

C. Vertical centrifugal pumps

The pump shall be manufactured and tested in accordance with

1. API 610
2. API 682 (for mechanical seal)

Remarks

Pump shall be in continuous service, heavy duty and easy maintaining
The pump should be supplied with electrical motor
Pump shall be contain no more than two stages
Motor power shall be 20% more than the maximum power of the pump
Pump should be furnished with stainless steel strainer
Clear and fully informative data sheet, performance curve, layout drawing with all necessary dimensions should be included with technical offer
A spare parts should include mechanical seal for each pump and a set of screw with liner for each screw pumps
The tabulated inspection activities for pumps should be in scope of supply

### INSPECTION REQUIREMENTS (SHOP INSPECTION)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CODES &amp; STANDARDS</th>
<th>REQUIRED INSPECTION AND QUALITY ASSURANCE CERTIFICATE</th>
<th>MANUFACTURER</th>
<th>THIRD PARTY INSPECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>INSPEC. ACTIVITIES</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>MRC / DAURA REFINERY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### HORIZONTAL CENTRIFUGAL PUMPS

- **API – 610 for Pump/Impeller**
- **API – 682 for MS**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CODES &amp; STANDARDS</th>
<th>REQUIRED INSPECTION AND QUALITY ASSURANCE CERTIFICATE</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td>MRC / DAURA REFINERY</td>
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</tr>
</tbody>
</table>

#### INSPECTION REQUIREMENTS (MRC SITE INSPECTION)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CODES &amp; STANDARDS</th>
<th>REQUIRED INSPECTION AND QUALITY ASSURANCE CERTIFICATE</th>
<th>ERECTION</th>
<th>THIRD PARTY INSPECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>INSPEC. ACTIVITIES</td>
<td></td>
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<td></td>
<td></td>
<td>MRC / DAURA REFINERY</td>
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</tr>
</tbody>
</table>

#### HORIZONTAL CENTRIFUGAL PUMPS

- **API – 610 for Pump/Impeller**
- **API – 610 for MS**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CODES &amp; STANDARDS</th>
<th>REQUIRED INSPECTION AND QUALITY ASSURANCE CERTIFICATE</th>
<th>ERECTION</th>
<th>THIRD PARTY INSPECTION</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>INSPEC. ACTIVITIES</td>
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<td>MRC / DAURA REFINERY</td>
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</tr>
</tbody>
</table>
## Inspection Requirements (Shop Inspection)

<table>
<thead>
<tr>
<th>Item</th>
<th>Codes &amp; Standards</th>
<th>Required Inspection and Quality Assurance Certificate</th>
<th>Inspection Activities</th>
<th>Manufacturer</th>
<th>Third Party Inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Certificate of Origin</td>
<td></td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Material Certificates</td>
<td></td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>VERTICAL CENFUGAL PUMPS</td>
<td>API – 610 FOR PUMP / IMPELLER API – 610 FOR MS</td>
<td>Surface for evidence of cracks, excessive roughness, laps, shrinkage or any other defects</td>
<td></td>
<td>R</td>
<td>R</td>
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<tr>
<td></td>
<td></td>
<td>Dimensional Check and Visual Inspection</td>
<td></td>
<td>I</td>
<td>CHW</td>
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<tr>
<td></td>
<td></td>
<td>Check Impeller Diameter and Vane Thickness</td>
<td></td>
<td>I</td>
<td>R</td>
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<td></td>
<td></td>
<td>Check Wear Ring Clearance</td>
<td></td>
<td>I</td>
<td>R</td>
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<td></td>
<td></td>
<td>Hydrostatic Test of Casing</td>
<td></td>
<td>T</td>
<td>R</td>
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<td></td>
<td></td>
<td>Balancing of Impeller / Shaft Assembly</td>
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<tr>
<td></td>
<td></td>
<td>Performance and Run Test AS NPSH Test</td>
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<td>T</td>
<td>W</td>
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<tr>
<td></td>
<td></td>
<td>Name Plate Marking</td>
<td></td>
<td>CH</td>
<td>W</td>
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<td></td>
<td></td>
<td>Painting</td>
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<td>CH</td>
<td>R</td>
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<td></td>
<td></td>
<td>Check of Completeness Include Spares</td>
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<td>R</td>
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<td></td>
<td></td>
<td>Preparation for Shipment</td>
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<td>Release Certificate</td>
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<td></td>
<td>Liquid Pentrent for Casting Welded Connections</td>
<td></td>
<td>R</td>
<td>W</td>
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</table>

## Inspection Requirements (MRC Site Inspection)

<table>
<thead>
<tr>
<th>Item</th>
<th>Codes &amp; Standards</th>
<th>Required Inspection and Quality Assurance Certificate</th>
<th>Inspection Activities</th>
<th>Erection</th>
<th>Third Party Inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERTICAL CENFUGAL PUMPS</td>
<td>API – 610 FOR PUMP / IMPELLER API – 610 FOR MS</td>
<td>Verification of Name Plate Information</td>
<td></td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Visual Inspection After Transport</td>
<td></td>
<td>I</td>
<td>CH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Verification of Foundation Design</td>
<td></td>
<td>I</td>
<td>W(spot)</td>
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<tr>
<td></td>
<td></td>
<td>Correct Pump Alignment</td>
<td></td>
<td>I</td>
<td>W</td>
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<tr>
<td></td>
<td></td>
<td>Base Plate Grouting Complete</td>
<td></td>
<td>I</td>
<td>W</td>
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<td></td>
<td></td>
<td>API Plan Operated Correctly</td>
<td></td>
<td>I</td>
<td>CH</td>
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<tr>
<td></td>
<td></td>
<td>Piping Independently Supported From Pump</td>
<td></td>
<td>I</td>
<td>W(spot)</td>
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<tr>
<td></td>
<td></td>
<td>Free Rotation</td>
<td></td>
<td>T</td>
<td>W(spot)</td>
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<tr>
<td></td>
<td></td>
<td>Check of Completeness</td>
<td></td>
<td>R&amp;M</td>
<td>R</td>
</tr>
</tbody>
</table>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>MANUFACTURER</td>
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<tr>
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<td></td>
<td>THIRD PARTY INSPECTION</td>
</tr>
<tr>
<td>SCREW PUMPS</td>
<td>API – 676 FOR PUMP/IMPELLER</td>
<td><img src="image" alt="Certificate of Origin" /></td>
<td>R</td>
</tr>
<tr>
<td></td>
<td>API – 602 FOR MS</td>
<td><img src="image" alt="Material Certificates" /></td>
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<tr>
<td></td>
<td><img src="image" alt="Material Identification" /></td>
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<td></td>
<td><img src="image" alt="Surface Checking" /></td>
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<td><img src="image" alt="Dimensional Check" /></td>
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<td></td>
<td><img src="image" alt="Check Impeller Diameter" /></td>
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<td><img src="image" alt="Liquid Pentrent for Casting Welded Connections" /></td>
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### INSPECTION REQUIREMENTS (MRC SITE INSPECTION)

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<tr>
<th>ITEM</th>
<th>CODES &amp; STANDARDS</th>
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4.4 PIPING

Piping shall be designed in accordance with the latest edition plus addenda of the ASME/ANSI code for pressure piping: chemical plant and petroleum refinery piping, ASME/ANSI B31.3; ASME/ANSI B31.1; and other sections which apply as listed below in remarks:

1. Piping shall be designed in accordance with ASME B31.3 standard

2. Category D and category M fluid services
   ASME/ANSI B31.3 requires OWNER to identify those fluid services which are in category D and Category M

3. Category D - A fluid service in which all the following apply:
   1. The fluid is nonflammable and nontoxic.
   2. The design pressure does not exceed 150 psig (10.3 barg)
   3. The design temperature is from (-20°C to 200°C)

   These services are as follows: shall be identified by feed contractor and provided thereupon

4. Category M - A fluid service in which a single exposure to a very small quantity of a toxic fluid, caused by leakage, can produce serious irreversible harm to persons on breathing or bodily contact, even when prompt restorative measures are taken.
   These services shall be identified by feed contractor

5. Severe cyclic service lines
   ASME/ANSI B31.3 requires the designer to identify those lines subject to service cyclic conditions. These conditions exist where SE exceeds 0.8 SA and the equivalent number of cyclic exceeds 7000; or where other conditions will produce an equivalent effect.
   These lines are as follows in accordance with process piping standards B 31.3
4.5 INSTRUMENTATION

The bidder shall design the control system required for this project in accordance with the following codes:

A. The Instrument Society of America (ISA)
B. American Petroleum Institute (API – RP550) or newer
C. British Standard Institute (BSI)
D. Underwriter Laboratories (UL)
E. American National Standard Institute (ANSI – B2 1 & B,5)
F. National Electric Code (NEC).
G. The Instrument Society of America (ISA).
H. American Petroleum Institute (API).
I. Underwriter Laboratories (UL).
L. British Standard Institute (BSI).
M. American Iron and Steel Institute (AISI)
N. International Electrotechnical Commission (IEC)
O. International Organization for Standard (ISO)
P. Institute of Electrical and Electronics Engineers Standards Association (IEEE-SA).
Q. British Approval Service for Electrical Equipment in Flammable Atmospheres (BASEFA)

A. General design

1. Basic design

1.1 Any omission in this specification shall not relieve the contractor of his obligation to furnish a system that is complete and which will operate in a satisfactory manner.

1.2 Bidders shall offer a modern systems and equipment which in corporate latest technology.

1.3 The contractor shall determine the need of redundancy to obtain the highest degree of reliability consistent with risk and economic of situation.

2. Instruments and associated equipment shall be designed and installed to meet the following requirements:

2.1 Full safety, maximum accuracy of measurement and control.

2.2 Efficient protection against abuse due to chemical or physical effects and weather
conditions.

2.3 All process variables effecting operation of the plant are under automatic control through instruments in the main control room.

2.4 All the electrical instruments and apparatus have to be installed in the explosion proof area and in accordance to the standard codes stated above.

2.5 Alarm & signal system shall be provided for all variables and shall be considered those audible and visible required for warning operating personnel of the need to take corrective process action to be advised on condition.

2.6 Instruments shall be protected from adverse conditions by protected sunshade, sealing, housing, insulating and purging if necessary.

2.7 All instrument devices shall be identified by means of metallic tag, plastic or paper tag shall not be used (plastic tag may be used indoors).

2.8 At an emergency failure of the instrumentation air or power, the plant shall be automatically shifted in a safe condition.

2.9 Engineering units shall be in accordance to the metric system.

2.10 Vendor shall supply any special tools or work station required for maintenance

2.11 Certification and reports shall be in English language.

2.12 Bidders shall offer in their proposal a modern systems and equipments which in corporate latest technology.

3. Accessibility of instrument devices

3.1 All instruments shall be installed so as to be ready accessible for handy adjustments and maintenance with hand held communicator and portable PC should be provided.

3.2 Calibration and alignment of all instruments shall be performed and verified by vendor prior to shipment.
B. Field and mounted instruments

Each field mounted instrument requiring air supply shall be provided with a combination air supply set, which shall consist of an air filter, a pressure regulator and output gauge.

1. Transmission system
   1.1 All transmitters shall have accuracy less than or more than 0.2% of full scale.
   1.2 Electronic two wire transmitters (hart protocol) shall be used with a signal at (4-20) mA dc, 24V DC, with screen (LCD display) with remote diaphragm seals for corrosive, viscous or condensing services.
   1.3 All transmitters should be equipped with Sun-shade for protection against direct sunlight and rain.
   1.4 All level, pressure, flow, Temperature ...etc electronic transmitter should be provided with local indicator.
   1.5 Instrument air signal tubing should be made of Copper material with 1/4" OD, air supply tubing should be covering with PVC material
   1.6 Armored twisted pair shielded cables supported on heavy duty galvanized cable tray with solid cover for electronic Transmitters and valves shall be used.
   1.7 All transmitters should capable of withstanding 150% of maximum range.
   1.8 Wetted parts should metal having a corrosion resistance.
   1.9 Instrument circuits shall be grounded to reduce the effect of the electrical interference.
   1.10 Weather proof should be used for field instruments.
   1.11 Electronic transmitter will be immune to radio frequency interference and other electrical noise.

2. Pressure Instruments
   1.1 Pressure gauges will be 150 mm (6") dial diameter with 1/2" NPT bottom process connection.
   1.2 Normal operating pressure will not generally exceed 75% of scale.
   1.3 Pressure element material AISI 316 minimum.
   1.4 All thermocouples shall be installed in thermo well st.steel or better suitable for their location, with outer diameter 3/4" NPT and the inner diameter1/2" NPT.
   1.5 For all pressure gauges installed on the discharge of dosing pumps and on the suction and discharge of reciprocating compressor and other pulsating service, pressure gauges will be supplied with pulsation damper or filled with glycerin.
1.6 Differential pressure gauges to be used across filters.
1.7 Pressure gauges will be waterproof IP55.
1.8 Pressure gauges will be provided with isolating valve and drain valve.
1.9 Any pump should be protected with pressure transmitters.

3. Level instruments
   3.1 Remote seal differential pressure electronic transmitters shall be used for level measurements.
   3.2 Glass Gauge (site glasses) shall be used as an auxiliary for all level transmitters.
   3.3 Levels transmitters and floats and glass gauge connection to vessels or towers etc. shall be of two inches side connections with isolating valves not less than 1½ inch. Drain valve and lines to the ground level to be used for all.
   3.4 Reflex type gauge glass shall be used except for interface, heavy services or steam transparent type with explosion proof fitting for proper lighting shall be used.
   3.5 For hot services and steam services mica shall be used in the glass gauge.
   3.6 Trucks level transmitters should be provided with high accuracy.
   3.7 The bidder should specify the type of Trucks level transmitters that’s compatible with our loaded products.

4. Temperature Instruments
   4.1 Thermocouples or Resistance Thermometer (RTD) will be used for temperature signal transmissions.
   4.2 Thermo well will be specified for all temperature measurement devices with the exception of Skin.
   4.3 Thermocouples sheaths will be constructed from seamless tube material with hot junction insulated.
   4.4 Thermocouple or RTD extension cables shall be armored and shielded.
   4.5 Thermocouples relevant to control loop will be equipped with integral mounted temperature transmitter and mv/current converter for indications.
   4.6 Thermocouple type “K” or “J” will be used for all services.
   4.7 RTD will be Pt100 ohm at 0°C three wires type.
   4.8 RTD relevant to control loop will be equipped with integral mounted temperature transmitter and resistance/current converter for indications.
4.9 Temperature gauges:
   - Temperature gauges will be used for local indication.
   - Temperature gauges will be Bi-Metallic type with 150mm dial calibrated in °C and stainless steel case material.
   - Temperature gauges will be water proof.

5. Flow instruments
   Flow measurement will normally be made using volumetric flow transmitters complete of local indicator with totalize account.

6. Control valves
   The control valves shall be supplied with flange type. Provided with positioned (HART Protocol) and I/P converters (4 – 20) mA DC made and shall be supplied with isolating and by pass valve.

7. Sewer pumps control
   Auto –Man switch locally shell be provided with level measuring means for indication and controlling the pumps.
C. Monitoring and control system specification

1. Description

1.1 The loading area shall be monitored using SCADA system and controlled using Program Logic Control (PLC) with redundant and both of them shall provide the same control and supervisory control function (SCADA system). Control system shall contain all controllers, indicators, recorders, and alarm and shut down system that in necessary to start up and operate the unit.

1.2 Recording (continuous) shall be provided for all process variables.

1.3 High/Low alarms are provided for all variables.

1.4 The processes, in which can appear a dangerous situation, will be connected to Emergency shutdown system (ESD, PLC).

1.5 The ladder program of PLC (project) should be provided to MRC in software (CD) and printed copy (papers).

1.6 Software of PLC and with floating license (unlimited time) should be provided to MRC.

1.7 All software should be installed on industrial workstations & laptop to help us in download & upload the project to PLC with maintenance the PLC.

1.8 PLC should be having external ram to save project.

1.9 Manual of control, wiring diagram.

1.10 All programmable devices should be complete system. The system should be tested and calibrated and ready for operation.

1.11 All documents of operation, installation, calibration should be provided to MRC.

1.12 Service tool that used to reload the program to the LAPTOP should be provided.

1.13 All software should be provided with original copies.

1.14 IF the software of PLC & workstations has any dongles should be provided to MRC.

1.15 PLC manual (service man, getting start and user manual) should be provided to MRC.

1.16 Card reader for CPU external ram should be provided to MRC.

1.17 Spare parts recommended with part number.

1.18 All password of PLC (Blocks, Ram, Project and others if exist) should be provided to MRC.
2. Redundancy
   2.1 I/O system shall be provided without I/O card redundancy.
   2.2 CPU and power supply cards in PLC, ESDS (Emergency shutdown system) shall be redundant.
   2.3 Process network shall be redundant.
   2.4 System power supply shall be redundant.
   2.5 Communication between PLC and ESDS shall be redundant.
   2.6 All communication should be provided with high speed.

3. Equipment for operation workstation in the control room
   3.1 At least two operator industrial workstations for the process operating, equipped by (4) LCD monitor (22" at minimum) (2 LCD for each operating station to control or view different pages in unit),
   3.2 Each workstation should have mouse, operation keyboard & standard keyboard.
   3.3 Each operator workstation should have color laser printer for reporting (hourly, daily, monthly, annual and archiving).
   3.4 Protect the work stations from viruses and malwares.
   3.5 The power supply of workstations should be having voltage range (100 to 220) V.
   3.6 Operation workstations should be continued operation in case of failure of one of two workstations by providing redundant units.
   3.7 The operation system should be windows 7 professional or higher.
   3.8 Operation workstations should have two hard disks in same specifications linked by using raid technology.

4. Equipment for the instrument engineering workstation & laptop in the control room.
   4.1 At least (One) common engineering industrial workstation & laptop for PLC system equipped by (2) LCD monitor (22" at minimum),
   4.2 Engineering workstation should have mouse, operation keyboard & standard keyboard.
   4.3 Each device will be connected or disconnected without system effecting
   4.4 Engineering workstation should have color laser printer for reporting (hourly, daily, monthly, annual and archiving).
   4.5 The engineering workstation & laptop are fully access to plc, operator workstation and the entire unit.
   4.6 The operation system should be windows 7 professional or higher.
4.7 Protect the work stations from viruses and malwares.
4.8 The power supply of workstations should be having voltage range (100to220) v.
4.9 Engineering workstation & laptop should have two hard disks in same specifications
   linked by using raid technology
4.10 Laptop should be rugged.

5. Equipment for the instrument field workstation in the control room.
   5.1 At least (One) common field industrial workstation equipped by (1) LCD monitor (22" at minimum).
   5.2 Field workstation should have mouse, standard keyboard.
   5.3 Field workstation should have color laser printer for reporting (hourly, daily, monthly, annual and archiving).
   5.4 The operation system should be windows 7 professional or higher.
   5.5 Protect the work stations from viruses and malwares.

6. The Specifications of the workstation computers:
   • CPU: core i7.
   • H.D: 500GB or higher. For each
   • RAM: 4GB or higher. DDR3
   • VGA : 1 GB delected
   • DVD: read/write.
   • O.S: windows 7 original CD with valid licenses.
   • DISPLAY: 22 inch high resolution, LED.

7. The Specifications of the LAPTOP GETAC type:
   • CPU: core i7.
   • H.D: 512GB or higher. For each
   • RAM: 4GB or higher.DDR3
   • VGA : 1 GB delected
   • DVD: read/write.
   • O.S: windows 7 original CD with valid licenses.
   • DISPLAY: 15.6 inches ,3200 x 1800 MAX or higher, high resolution, LED
   • Battery: 9 cells
D. Specifications of cabinet PLC and industrial operation engineering station.

1. The control panel shall be in an air conditional control room.
2. The cabinets shall have back doors, ventilated and provided with Fluorescent lamp, dust proof and locked by key.
3. On-off push button for emergency put in control panel.

E. Control Manipulation

4. The operator station shall provide the following function:
   - Indication of control and non-control variables.
   - Manipulation of control loop, including set point, mode of operation and output.
5. Process graphics (schematics) based on P&I Diagrams with Superimposed current readings for monitoring and controlling the plant.
6. Individual and group-displays of measuring and control loops showing all relevant parameters.
7. Status displays of sequential control performances.
8. Recording by dedicated, real-time and historical trend recorders.
9. Alarm annunciation and display.
10. Event logging.
11. Start/Stop software push button motor station operation.
12. Open/Close software push button valve station operation.
15. Trend recording.

F. The report data base must include as a minimum the following information.

- Plant number and Tag number.
- Tag description.
- Time of status change.
- Magnitude and sign of process variable.
- Engineering unit of process variable.
- Flag for operation manual data entry.
- Flag indicating if data is out of reasonable tolerance.
- Flag indicating status change or alarm set point.
- OS keyboard entry.
G. ESD System (PLC)

The ESD system is emergency shutdown system, which is used as a protective system for a safe process shutdown in emergency cases. All input signals to the ESD system are communicated to the PLC, where they are processed and archived. The ESD system operates totally independently and performs all its functions.

The ESD (PLC) system shall fulfill the following basic requirements:

1. Separate transmitters are used for the ESD system.
2. Automatic shutdown of the controlled equipment or part of there in case of occurrence of conditions those are dangerous to the operation.
3. Protection shall permanently function, independently of the selected mode of operation.
4. The operator shall be able to inactivate the protection in abnormal condition by special keys or password.

H. Alarm management:

1. Each operator industrial station shall be capable of alarm monitoring.
2. Available alarm shall be of absolute or deviation type. Operator shall be alerted by horn and visually, on alarm occurrence.
3. Alarm summary display shall alert the operator when points are in alarm and shall list item as they occurred sequentially. The printer shall print time, type and description of alarm.
4. Alarm group display shall be able to display on any operator station.
5. The size alarm group shall be selectable. Alarm could be acknowledged. System alarm shall be presented to the operator when there is malfunction, based on system self-diagnostic capacity.
6. Alarms shall be divided into two basic types one type shall be the PLC system status alarm. This alarm shall indicate a malfunction in the PLC.
7. The second type is the process alarm, are generated by deviation from normal operating conditions or by undesired event.
I. Access authority

Depending on their function and qualification the following persons, generally called operators, will be given certain access rights to the functions of the system and the plant sections to be operated:

- Operator monitoring, operating.
- Supervisor monitoring (SCADA system) operating, changing parameters.
- Engineer changing system configuration, no restrictions.
- In the simplest case access rights will be defined by user name and password.
- Set points, alarm limits, process interlocks or other set point entries shall be changed only with suitable access rights.

J. Availability of the automation system:

For a safe and traceable shutdown of the plant the instrumentation and control system shall be provided 2 hours after the power failure.

K. Cables

1. Multi core cables will be used between the control room and field junction boxes and single pair cable between the field junction boxes and individual instruments.
2. The signal cable will be grounded to reduce the effect of electrical interference in control room.
3. Each pair or triad will have number and color identification.
4. Cable will be fire retardant in accordance to IEC.
5. Cable will be galvanized steel braid armored.
6. Cable routing:
7. Cables between field junction boxes and control Room will run on cable tray the cable will be segregated as follow:
   - Instruments signal cables and Power cable.
   - Cable between instrument and junction boxes will run in cable tray.
   - The cable-tray will be manufactured from hot dip galvanized steel.

L. Junction boxes for instrument cables

1. Junction boxes will be approved design with components to meet the requirements of the area classification.
2. Junction boxes will be purchased with holes for cable glands already drilled.
3. Holes will be equipped with plug or cable gland.
4. Unused holes will be plugged to prevent water entering.
5. The cable entry will be at each side for single pair / triad and bottom for the multi core(s).
6. Junction boxes will have facilities connect armored cable to grounding system.

M. Instruments installation

1. The instruments installation will be carried out according to the good engineering practice and requirements set forth in the latest edition of API RP 551.
2. The instruments will be installed in such a way to obtain accurate measurement and to permit inspection and adjustments to facilitate maintenance works.
3. All gauges glass will be provided with a valve drain connection and plugged connection at the top to facilitate clean-out.
4. Instruments and their process connections will be protected by means of heating against freezing or congealing temperature, if required.
5. Impulse line will be kept as short as possible and will ensure:
   - Freedom from blockage.
   - Self - drain and venting.
   - Avoidance of vibration.
6. Impulse line and manifold will be AISI 316 stainless 12 mm O.D. tubing and relevant compression fitting will be used.
7. Transmitters and pressure gauges will include manifold for process insulation, vent and drain.
8. Manifold will be:
   - Three (3) valves, Five (5) ways for differential pressure transmitters.
   - Two (2) valves, Three (3) ways for pressure instruments.
9. Instrument accessibility:
   dd. Connection will be oriented so that instrument and piping will not obstruct walkways or platform.
   ee. Control valves will be accessible from grade, platform or permanent ladder.
   ff. All instruments required adjustment will be accessible for serving from grade walkways or fixed platforms.
   gg. Transmitters may also be accessible from portable platform where necessary.
   hh. Where possible the centerline of instruments will be 1.3m above grade or platform with the exception for integral flow transmitters and line mounted instruments.
   ii. All instruments will be installed to have accessibility for maintenance and reading.
N. Fire and smoke detection
   1. The smoke detections will be strategically located in order to guarantee a prompt
detection of any smoke.
   2. Fire alarm control panel will be located in Control Room and will be connected to the field
mounted detectors.
   3. Fire alarm control panel will be interfaced to a PLC Plant controller and will be
interlocked with emergency shutdown.

O. Field services
   During on past experience and based support PLC, in vendor has assembled a field package for the refinery.
The team which will implement this package consists of:
   - System Service Specialist.
   - Service Representative.

This team will work with engineers as described as on site management services. The general functions
which will be performed for site inspection and installation supervision will greatly assist in system startup and
are also described. Other field services are provided for the post installation test and abstained performance
test as explained. Education of operator, technicians, Engineers and managers are considered by vendor to
be extremely important in the sale of its system product and is discussed in this section.

P. Pumps control
   All equipment like pumps must be provided with suitable protection device such as pressure switch.
Level switch with auto – manual switch locally shall be provided with level measuring means for indication and
controlling the pumps.
Porcelain floats with stainless steel wires, pulleys and flameproof switching to be use.

Q. Spare parts
   1. All I/O cards in the PLC shall be provided with minimum 20% spare connection points for maintenance and
future expansions.
   2. The spare parts of instrumentation shall be include but not limited to the following
      - CPU of PLC with project
      - Important sensors and transmitters
      - Power supply of PLC

R. Factory Acceptance Test (FAT)
Vender shell conduct a detailed FAT which includes 100% I/O test, hardware configuration, network communications, software applications, logic, graphics, reports, etc.
4.6 METERING

The main requirements of measuring skid that compliant with the Iraqi National Code & International codes of custody transfer calculations.

A. Main Requirements

1. Isolation Valve (Double block and bleed valve) on Inlet and outlet of skid before and after meter.
2. Strainer and Air release equipped with air sensor connected to flow computer to monitor Air alarm if big volume of air flow inside air release.
3. Volume loading skids equipped with Coriolis meter or Biorotor meter (equipped with density meter) connected to flow computer to correct the quantities to reference conditions and connected to SCADA.
4. Mass loading skids equipped with Coriolis meter or Truck scale connected to flow computer, PLC, SCADA system.
5. Pressure and Temperature gauges & transmitters installed after meter connected to flow computer, and monitor in control room.
6. Thermal relief valve to protect the skid of high pressure from thermal expansion set to max pressure of skid with flow computer ability of shut down the system in high pressure to protect of damage.
7. Sampler for providing samples according to specification of fluid nature and conditions.
8. Control valve appropriate with fluid temperature, specification and loading conditions.
9. Flow computer facilitated to work and connect with SCADA sys. & thermal compensation for volume with standard conditions & able to work on Mass loading, control all skid equipment.
10. Two Calibration connections equipped with two isolation valves (double block and bleed valve) with one between, the connections isolated by blind flange.
11. The products loaded with volume must be volume composited corresponding to standard conditions temperature 15°C and pressure 1,01325 bar by flow computer and archived in data base.

B. Others

1. Meters, truck scale, flow computer, transmitters & gauges accepted of west Europe, USA, and Japan.
2. Coriolis meter of manufacturer Endress and Hausser, Biorotor meter of manufacturer Brodie.
3. All equipment and design of skids, operation, install, inspection and calibration corresponding to Iraqi National code, API MPMS for chapters (5,6,8,11,12 & 15 ) and to ISO standards (ISA - S12.1 , ISO 5024 ) ,provider will be full response of design with suggestion and modification in technical conformity period.
4. Warrantee of performance and working for 12 months from commissioning (final startup date), all damaged equipment in commission, and startup period should be compensated or replaced by provider.
5. Spare parts list recommended by manufacturers for two years operation include but not limited to the following: 2 flow computers, power & signal cards, electrical fuses, 2 pressure transmitters, 2 temperature transmitters, one meter for each kind, truck scale accessories if offered … etc., the list should be provided during technical conformity period.

6. SCADA System for loading operation are automatic in all aspects without human interference and ensure to reduce human errors during loading operation preparation to display ready status on monitor with facilities of loading (volume, mass, net volume, weight and recorded quantities with the state of valves and alarms.

7. Calibrating the measuring skids and equipment during commissioning period by real conditions of loading and with third party if required or requested by Midland Refineries Com. Then issued and printing reports of calibration then all calibration equipment and devices will owned to our company MRC after final acceptance of project.

8. Origin certificates legalized by Iraqi embassies in origin countries.

9. Factory calibration certificates for all devices, equipment, calibration devices and skids should be provided during the receipt period.

10. Provide all technical catalogues & specifications for all equipment and devices with specific kinds attached by P&ID into the technical offer with all specific parts & details for conformity.

11. Provide training list contain details with considerations of (install, connect, connect protocol, maintenance, calibration, software with accessories, operation, commission, troubleshooting) for all measuring and calibration equipment.

12. All tools & equipment that used during installation of measuring skids be back owned to our company (Measuring and Calibration dep.) with tool kit provided to maintenance of all devices and equipment.

13. Skids, equipment, devices will work 24 hours daily / 7 days weekly.

14. All equipment, devices, glands, junction boxes, transmitters, gauges, sensors and connections should be EX – D and ready to operate in dangerous environments.

15. Measuring range of measuring skids shall be (10 % - 90 %) from full scale.

16. Loading data base include reports (loading, calibration, daily loading, monthly loading) with fields as follows but unlimited to (trucks, driver name, loading time, loading duration … etc) with any additives parameters specified by end user and customer may need in the future.
C. Project tanks gauging computer

The following requirements for tank gauging system should be cover in the scope of work

1. Industrial computer (CPU core i5, HDD 500 GB, RAM 4 GB, monitor 19 inch) or better.
2. Panel.
3. Online UPS should provide continues power supply for 2 hour as mentioned in the electrical part requirements in this TD point H part 3.
4. Laser color printer.
5. Field communication unit (FCU)
6. Field bus modem (FBM).
7. Tank master software original copy.
8. Dongle key for 50 tanks.

   Items (5, 6, 7 and 8) manufacturing Rosemount (SAAB).
4.7 ELECTRICAL

A. The electrical equipment shall be designed and supply and installed to meet the following:
   1. Safety to personnel
   2. Reliability efficient and smooth performance
   3. Easy Maintenance and replacement
   4. Performed according to the specification and last issue of codes and standards
   5. The equipment and installation in-hazardous area shall meet the requirement of the following codes:
      - API TP 500 A, B, C as applicable for classification of hazardous area EEXDII CT4.
      - Recommendation and standard issued by the IEC regulation.
      - Standards of the country of origin when no IEC standards exist and in this case VENDOR shall state in English to compare it with IEC

B. Electrical power supply and power distribution

   The project (HPTLS) should be containing new electrical substation (new electrical substation of the project) and the power of the new electrical substation of the project feed (NO.1 feeder medium voltage M.V 3.3KV) from our existing main electrical substation. The new electrical substation of the project should be consisting of M.V and L.V panels

   The M.V panels should be consist of the following:
   1. Incoming feeder switchgear
   2. Bus riser and measuring switch gear
   3. Transformer feeder switchgear

   The L.V panels should be consist of the following:
   1. Main distribution power center(MDPC)
   2. Motor control center(MCC)
   3. UPS, Battery Charger
   4. Lighting panel

C. Main Feeder Cable

   The contractor shall supply all the equipments and materials given below:

   1. The contractor shall supply the main feeder cable between our existing main electrical substation and the new Electrical substation of the project with distance length between two sites approximately (200) meters.
   2. All necessary straight joint boxes and terminations.
   3. The feeder shall have enough capacity to feed the total power of the plant
D. M.V. Switchgear:

The M.V switchgear should be with the following specifications:

1. Indoor, free standing, Metal–Enclosed Switchgear designed for M.V substation, the Switching devices are of the metal clad with drawable type, floor mounting with bottom plate, dead–front structure grouped together for centralized control, IP44, structure shall include the necessary Comments for protection of transformers and other type of feeders.

2. M.V. 3.3KV circuit breakers for the incoming feeder and other outgoing feeders, (transformer feeders) their design are using SF6 arc interruption technique or vacuum with drawable type and the M.V switchgear with electrical-manual closing with stored energy feature electrical – manual tripping for each breaker, the panels shall be supplied with metering device and effective full protection. all indication and control devices are front mounted.

3. The end of M.V switch gear shall be suitable for future extension.

4. The switchgear rated voltage 7200 volt AC (minimum).

5. Operating voltage 3300 volt AC.

6. Switch gear equipments and protection relay should be designed for 55C° Ambient temperature.

7. Control voltage 110 VDC.

8. Bus bar rating 1250 A.

9. Short circuit level 40 KA (minimum) for (3sec).

10. Space heater thermostatically controlled and to be provided for circuit breaker Compartment.

11. Earth switch provided and inter lock with circuit breaker.

12. Battery charger with Ni.CD. Batteries, 100% redundancy for control voltage (110VDC) of M.V Switchgear and low voltage main distribution power center and Motor control center (MCC).

13. Separate control board for test and maintenance of each M.V circuit breaker.
E. Power transformer
   1. 3.3 kV / 400-231 volt 3 phase 50 Hz oil filed 55/65 ºC rise, naturally cooled, Outdoor type .with terminal boxes for M.V. and L.V. sides should be IP54.
   2. Transformer with off-load tap changer of "5" steps
   3. Transformer size shall be based on 55 ºC rating for the operating loads in the initial design condition loads indicated as future shall be included in the initial transformer size
   4. The Transformer shall supply 120 % of the total load which consist of max power demand of the connecting load and indicated spares & future extension.
   5. The vector group Design of Tr is Dyn 11 and the Neutral point brought out through the bushing.
   6. The transformers shall have the following fittings;
      a. Conservator
      b. Buckholes Relay with alarm and trip contacts
      c. Dehydrating Breather
      d. Dial thermometer with alarm and trip contacts
      e. Expansion Vent
      f. Oil Drain Valves
      g. Unidirectional Roller

F. Low voltage Main Distribution Power Center(L.V.M.D.P.C)
   The Low voltage Main Distribution Power Center should be with the following specifications:
   1. Low voltage main distribution power center shall be metal – clad free standing floor mounting with bottom plate Indoor installation, IP 44 weather protected.
   2. The Low voltage main distribution power center shall be supplied by one incoming feeder.
   3. Air Break circuit Breaker with drawable type should be used for all the Incoming, and outgoing feeders.
   4. The incoming and outgoing feeder Breakers are with Manual-electrical closing mechanism with stored energy feature, Manual – electrical tripping and shall Contain their Ammeters, voltmeters, selector switch, indication lamps & over current short circuit tripping devices, 110VDC supply for closing & tripping.
   5. The power center should be contain 2 outgoing feeders of 250 A rating with the same specification given above for requirements
G. Motor control center (MCC)

1. The motor control center (MCC) shall be metal – clad free standing
   Floor mounting with bottom plate Indoor installation, IP 44 weather protected.
2. The motor control center (MCC) shall be supplied by one incoming feeder.
3. Air Break circuit Breaker with drawable type should be used for all the
   Incoming, and outgoing feeders.
4. The incoming and outgoing feeder Breakers are with Manual-electrical closing
   Mechanism with stored energy feature, Manual – electrical tripping and shall
   Contain their Ammeters, voltmeters, selector switch, indication lamps & over current
   Short circuit tripping devices, 110VDC supply for closing & tripping.
5. The motor control center (MCC) shall contain the motor starters of with drawable type for both power and
   Control Cables & each starter should be consist of:
   a. High Breaking capacity MCCB with adjustable short circuit current, used for power
      isolation and short circuit protection.
   b. Magnetic air Break Contact
   c. Thermal over load relay with single phasing presentation
   d. Current transformer for remote ammeter
   e. Start, stop, reset P.B. with indication lamps
   f. Means of isolation.
   g. Earth fault protection for motors with power greater than 4KW
   h. Remote start - stop push button facility
6. The motor control center should have at least 20% spare starters complete for future use and of different
   capacity.
7. Control voltage shall be 220 VAC/50 Hz line and neutral from itself motor Starter.

The Low voltage Main Distribution Power Center & Motor control center (MCC) should be supplied with
the following specifications:

a. The equipment in the MCC and power center rating at 55°C ambient temperature.

b. Rated voltage 1000 volt.

c. Operating voltage 400 volt.

d. Bus bar to be insulated and silver plated for all contact area

e. Rated short circuit level 80KA (minimum) for (1sec).
H. Uninterrupted Power Supply(UPS) system:

Uninterrupted power supply (UPS) system housed in metal clad, free standing floor mounting, IP(42), Ambient temperature (55°C), the UPS should be with 100% Redundancy with one Ni.CD batteries set With enough capacity for two hour during power failure. the type of UPS should be double conversion Topology (On – line), the UPS system should be supplied with all accessories needed for installation and with the following components:

1. Input power (380/220) VAC, 50HZ from low voltage main distribution power center, the input power is through molded case circuit breaker of thermal and magnetic release for over load and short circuit protection.
2. Output power to the batteries D.C is through molded case circuit breaker
3. The output power shall supply the instrumentation boards, control system and radar system (control system voltage depend on manufacturer design) and the output power should be through molded case circuit breaker of thermal and Magnetic release for over load and short circuit protection.
5. Over load capability (130% for 10 minute) and (160% for 1 minute).
6. UPS system Designed for continuous power protection of critical equipment against all nine power Problems:
   1- Power failure.  2- Power sag.  3- Power surge.  4- Switching transient.
   5- Line noise.   6- Frequency variation and disturbances. 7- Over voltage.
   8- Under voltage.  9- Harmonic distortion.

And single line diagram of UPS such as following:
I. Battery Charger system:

Battery charger system housed in metal clad, free standing, floor mounting, IP(42), ambient temperature (55°C), Battery charger system should be with 100% Redundancy with one Ni.CD. batteries set with enough capacity for two hour during power failure, battery charger system should be supplied with all accessories needed for installation and with the following components:

1. Input power (380/220)VAC, 50HZ from low voltage main distribution power center, the input power is through molded case circuit breaker of thermal and magnetic release for over load and short circuit protection.
2. Output power to the batteries D.C is through molded case circuit breaker
3. Output power 110VDC, through molded case circuit breaker of thermal and magnetic release for over load and short circuit protection.
4. D.C distribution board that consist of (6) miniature circuit breaker of magnetic release mounted on front panel of battery charger with range of miniature circuit Breaker (16-25)Amp that supply the control voltage for (M.V, 3.3KV) Switchgear, low voltage main distribution power center and motor control center (MCC).

J. Electrical motors

The electrical motors should be with the following Specifications:

1. Electrical motors shall be squirrel cage induction, TEFC, IP55 weather protected Class F insulation, B-temperature rise, ambient temperature 55°C, IC 411 cooling type, 0.9 power factor. And Metallic Cooling fan.
2. Explosion proof motors EEXDICT4 shall be used
3. Motor rated power shall be 120% of the driven load rated power.
4. Power shall be supplied to motors as follows:
   - Up to 100 KW: 380V, 3 phase, 50 Hz.
5. Each motor shall be provided with local start — stop push button station flame proof near each motor controlled by remote starter, this P.B station shall be equipped with ampere meter for motors of 3KW and more
K. Lighting system

1. Lighting fitting shall be of florescent, metal halide industrial type for the loading station and new products tank areas as shown in (EXHIBIT 1B) where flame-proof fitting required outside on the process area and then weather proof lighting fittings shall be used inside buildings.

2. Average illumination measured at 0.75 meters above floor shall be as follows:
   a. Electrical substation and control room of the project 300 LUX
   b. Pump area 300 LUX
   c. Hot oil area 300 LUX
   d. Tanker filling area 300 LUX
   e. General lighting to be 150 LUX

3. Lighting circuits shall be controlled by flame proof switches inside unit

4. Switch socket flame proof for 24 volt shall be provided through the unit for portable hand lamps during shutdown

5. Lighting supply shall be 220V/50 Hz single phase line and neutral

6. Max voltage drop between the main lighting switch board and the terminals of any light fitting shall not be more than 2.5% of the nominal voltage

L. Electrical cables

1. All cables for project requirements shall be supplied

2. Minimum cross section area for cables shall be 2.5mm² for power cables, 1.5 mm² for control and lightning cables and shall not be less than three strands each core.

3. Cable shall never be loaded to more than 75% of their nominal rating.

4. XLPE multi-conductor (0.6 – 1) KV grade shall be used with copper conductors

5. All (3.3KV) power cables should be stranded copper conductor, XLPE insulation, Semi – conductor tape, copper tape screen galvanized Steel wire armored , P.V.C over sheathed hydrocarbon resistant.

6. All low voltage (0.4KV) power cables should be stranded copper conductor, XLPE insulation, copper tape screen, galvanized Steel wire armored , P.V.C over sheathed hydrocarbon resistant.

7. Low voltage motor cable shall be sized such that the voltage drop does not exceed 2% between transformer terminals & Motor terminals under normal motor running.

8. Cables in the unit shall be laid in a concrete or brick walled trenches of adequate width and depth. Cable trenches shall be covered by concrete cover of adequate thickness. Cables from the main cables trench to the motor plinth shall be run in buried steel pipe.

9. Cables outside operating area shall be laid directly in the ground and protected by concrete cover tiles with route markers.
M. Earthing system

1. Suitable earthing shall be installed for
   a. Safety to personnel
   b. Limit the voltage when an earth fault occurs
   c. Protection against lightning
   d. Protection against static electricity

2. Earthing network shall be installed around sub-station process unit tank farm by means of copper rods of sufficient length.

3. At least one point of earthing system shall be connected to each of the motor frame switch board, transformer, tanks, steel structure columns ... etc.

4. The resistance of the earthing when measured individually shall be less than:
   a. Transformer neutral point system (4) ohm
   b. Power earthing system (2.5) ohm.
   c. Static earthing system (7) ohm.
   d. Lightning protection system (5) ohm.

5. All earthing under Ground joints shall be of thermo weld type or equivalent and the earthing network shall be made of stranded copper wire hard drawn 70 mm²

6. Any structure column or equipment shall be shield against if it is within a 90 cone of highest point of earthed steel structure connected at two side with sufficient copper conductor to the earthing system Metal frame structure or equipment not shielded as above shall be earthed on at least two side to the earthing network.

7. Connection of earthing system to the earth electrodes shall be accessible for testing & inspection.

8. All tools and accessories for earthing system including the stranded copper wire, earthing rods shall be supplied

9. Lighting protection shall be provided for structure column, metal frame structure.

N. Electrical substation and control room:

1. Electrical substation and control room buildings should be supply with 100% redundancy air conditioned system (HVAC package unit system) for 55°C ambient temperature. and the specifications should be suitable for the position of the (HVAC system) and area classification

2. Electrical substation and control rooms shall be furnished with:
   a. Telephone outlets and telephone sets.
   b. Fluorescent lighting fittings, 220v switch sockets, lighting switch ....etc.
0. General electrical requirements

1. Indications: Indicating lamps shall be installed in the control room and at the starter panel itself for both ON-OFF position of all motors.

2. Equipment identification:
   The service of equipment such as, motors, circuit breakers, motors Starters, Lighting switches, and PB station shall be properly identified and engraved on the apparatus.

3. Equipment test:
   3.1 The vendor should be submit for approval complete list of tests that should be performed on all electrical equipment shall be supplied by the contractor in accordance with the requirements of various regulations, codes, and job design Specification, before they are placed in operation. All the electrical equipment shall be tested with witnessing and certification. All test equipment such as (Megger, Digital clamp, AVO ... etc.) should be supplied with at least 3 No. quantity.
   3.2 Certificate tests must be carried out in manufactures works for all equipment.
   3.3 Acceptance of the complete electrical installation shall be contingent upon Inspection and test results.

4. Accessories
   All accessories for installation should be supply such as (cable glands, junction box, cable trays, conduit ... etc.)

5. Electrical spare parts:
   Recommended electrical spare parts list should be supply for two years and should be containing at least the following items:
   a. For M.V. switchgear
      (Protection relay, closing coil, tripping coil, charging motor)
   b. For low voltage power center and MCC
      1. Major component of the low voltage power center for main circuit breakers
      2. Major component of the motor starters such as (Circuit breakers, contactors, thermal overload, Current transformer, ampere meter ... etc.)
      3. 3 – 20% of all lamps used with accessories.
      4. Major component of the UPS and Battery Charger system.
      5. Major components of lighting panel and lighting fittings.
P. Outlet sockets and plugs
   1. 220V, 1-phase, outlets for various purpose shall be considered, flame proof type EEXDII CT4.
   2. 3phase, 380V ,60A welding socket outlets shall be flame proof type EEXDII CT4 controlled by an inter locked isolating switch.
   3. Each type of outlet socket installed in the unit should be supplied with enough quantity of plugs with spare.

Q. Other electrical requirement
   1. Fire alarm system: should be consist of the following
      a. Push bottom (call point) flame proof outside in the failed
      b. Smoke detector in the electrical substation and control room
      c. Heat detector flame proof outside in the failed
   2. Paging system shall be in scope of supply (containing receiving and transmitting device).
   3. Wherever it is needed cathode protection shall be supplied.
   4. Earthing system device should be supply near the metering skid & all operation of electrical motor starter depend on satisfy the permission of earthing system device.
5. SAFETY AND FIRE FIGHTING

The project shall be designed and fabricate to meet the safety and firefighting requirements listed below,

A. General
   6. Safety and fire protection requirement shall be according to NFPA code, API standards, and OIA standard, pollution shall be relevant to USA standard (EPA)
   7. Noise shall be according to OSHA or relevant USA standard
   8. HAZOP study application for the project should be included
   9. Smoke and heat detector system, these detectors shall be fitted inside the control room, and operators room; this system will detect the presence of fire and trigger a sound and light alarm in control and other rooms

B. Fire water grid
   The project fire water grid shall be designed to satisfy fulfill the following requirements;
   5. The header shall be elevated underground with 10" minimum diameter
   6. The header with its grids and branch's shall be cover whole project area
   7. The header and its grids shall be provided by sufficient number of isolating gate valves, so that any single grid can still supply not less than 50% of the fire water requirements

C. Hand held fire extinguishers
   The project shall be provided at least with the following hand held fire extinguishers cylinders
   1. 16 dry chemical powder fire extinguishers (12kg capacity for each) with internal cartridge fixed in suitable cabinet
   2. 6 CO₂ fire extinguishers (5kg capacity for each)
   3. 10 wheeled dry chemical powder fire extinguishers (25kgcapacityfor each) with external nitrogen bottle or cylinder
   4. 4 wheeled CO₂ fire extinguishers (15 - 20kg capacity for each)
   5. 6 mobile foaming carriers (120lit capacity for each) contain 2 delivery hoses and inducing of foam and foam generator (500lit / min capacity )
   6. 12 dry chemical powder fire extinguishers (6kg capacity for each ) with internal cartridge fixed in suitable cabinet.
D. Hydrant

The project shall be provided at least with the following hydrant system

2. The project shall include 12 vertical, wet type hydrant of carbon steel vessels with 150 – 200 m³/hr of capacity

3. Each hydrant vessels shall be provided with four outlets valves of (size 2½”) and instantaneous coupling to BS – 336 and one outlet size 4” threaded with cap

E. Other requirements

1. Total flooding system for electric power stations (FM 200 or Aragonite) according to NFPA standard

2. Snuffing steam for hot oil heater.

3. Six manual monitors with isolating valve with capacity 3000 l/min of fog and spray nozzle, jet nozzle and each monitor provided by pick-up tube of 3% induction rate of foam fixed on suitable place

4. Six hose storage boxes each one contain the following;
   - Two fire hose (size 2½” and 23m length) with instantaneous couplings
   - One water nozzle (jet and spray) with 750 l/min of capacity
   - One hand branch pipe foam generator with 500 l/min of capacity
   - Two hydrant wrench
   - 1 portable monitor with 1500 l/min of capacity & 1 foam inductor range (0 – 6) %

5. The pump stations must protected by sprinkler system according to NFPA standard.

6. The loading racks of products must protected by fixed foam system (bladder tank).

7. Combination emergency shower (body & eyes) unit (QTY- 2)

8. Fire alarm push -buttons (QTY- 6)
Adopted of Ambient air quality Iraqi standards:

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<tr>
<th>Pollutant</th>
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<th>US EPA</th>
<th>Adopted project Air Quality Std.</th>
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6. CIVIL ENGINEERING

1. The following standards or the equivalent shall constitute as a guide for design:
   1. ACI American concrete institute
   2. ANSI American national standards institute
   3. AISC American institute of steel construction
   4. All materials imported shall be conform to ASTM (American society for testing material)
   5. Local materials shall conform to the local IRAQI Codes

2. The height of ground water level shall be 1.5m at April and 4m in November, the site area is 30 meter above sea level

3. Material for construction
   A. Cement
   B. Sand and gravel
   C. Reinforcement bars
   D. Terrazzo tiles – plastic tiles
   E. Asbestos cement sheet
   F. Sheet for roofs (galvanized and metal type)
   G. Bricks (23.5x11.5x7.5cm thick) concrete block (40x20x20cm thick)
   H. False ceiling materials
   I. Doors and windows (glass shall be reinforce glass type of 6mm thick as sheet)
   J. Any other material required for the plant construction shall be supplied by contractor

4. Painting
   A. All the equipment, piping and steel structure shall be primary coated, painting material required for (three layers) coating at site Shall be supplied by Bidder
   B. Any concrete area in contact with chemical material shall be coated with proper type of epoxy

5. Soil condition
   A. All information about soil layer shall be given in soil investigation
   B. In general the load bearing at the soil is about 5 tons/m² meter
   C. All foundation shall be at 1.0 meter depth the load bearing is 7ton/m² at 1.5 meter depth
   D. The sulphate resistant shall be used minimum weight of cement shall be 380kg/m³ of concrete
   E. Concrete in contact with soil shall receive 3-habds of bitumen coat (flunkout or similar) as approved by MRC office
F. All roads and paving area: all roads, paving other than walk way shall of sufficient width and strength to handle cranes operation

G. Steel structure for the pipe and equipment shall be prefabricated steel shops

6. Cable trench
All cables shall be laid in a concrete trench with proper width and depth covered with concrete slabs

7. Insulation
A. The entire hot surface (pipes or equipment) shall be isolated by thermal Calcium silicate insulating material of block type
B. The insulation shall be gladded by Aluminum sheet with all other accessories
C. The outside temperature of insulated surfaces shall be maximum 25°C above the ambient temperature

8. Control building shall be one level consist of the following
Control room, four operator room, two WC, kitchen, store and trucks driver rest room.

9. Anchor bolts, bolts and nuts
All anchor bolts and bolts and nuts required for the project shall be supplied by bidder every type shall be packed and numbered according to the places where it is used

10. The scope of supply shall include in addition to the normal components
A. Complete design of the building
B. Complete supply of materials including but not limited, to (cover head crane, exhaust fan, steel doors, and windows)

11. Water run-off / sewer and drainage system
A. Paving shall be provided, the requirements is in accordance with BS and industrial norms derived from experience on safety and accessibility
B. Access way shall be provided
C. Run-off design factors paved areas 0.95 unpaved area 0.6
D. Road ways shall be paved to the AASHTO, all roads, pavements other than unit way shall be of sufficient width and strong enough to handle cranes operations
E. Oily water sewer shall be provided
F. Chemical sewer, chemical drain (acidic and alkaline) such waste shall be neutralized first in a special tank before disposal to the waste water collection basin
G. Soil, water waste from closet and urinals wash room…etc, shall be connected to aseptic tank and over
flow shall be connected to the sewer pit
H. Process drains shall be separately connected and fed to waste water collection basin
I. Rain water drains shall be separated and it is connected and to waste water collection basin
J. The waste water from the collection pit will be pumped to the waste water treatment unit or API basin
K. All pipes and accessories for sewer drainage system shall be supplied by contractor
7. INSPECTION AND QUALITY REQUIREMENT

1. Because of difficulty in making rectification and Replacement in IRAQ, a high standard of inspection is required. Details of inspection authority shall be as set out in the form of contract.

2. DAURA's inspection department and/or the inspection organization nominated by DAURA (here in referred to as inspection authority) shall collectively fall under the heading of "INSPECTION AUTHORITY" which shall (for the purpose of contract) be deemed to act behalf of the M.R.C (general manager of middle refinery).

3. The procedure of notices and divisions of duties between the contractor and the nominated inspection authority shall be decided by MRC.

4. All inspection and tests carried out by the inspection authority and/or the contractor's inspector team shall be performed in accordance with the standards mentioned in the contract, which is briefly mentioned previously in this EXHIBIT section (4 and 5) to ensure complete adherence to the contract requirements.

5. All equipment materials shall be specified according to ASTM designation (With the conformance of ASME CODE sec II requirement) exclusively in the contractor technical proposal and any other equivalent standards are un accepted.

6. The contractor shall be responsible for supplying the inspection authority in good time with all drawing, specifications and design documents required for the performance of the inspection work.

7. The raw materials of all steel plates which intend to use in fabrication of equipment shall be fully killed steel, also the strongest supplementary requirements according to the ASTM standard shall be used to ensure that the raw material of all steel plates are free from any internal discontinuities such as (cracks, void, pipes, ruptures and laminations…etc.) and the original document (inspection and test report) for all destructive and non-destructive tests according supplementary requirements with the original material certificates shall be issued and transferred or supply to the MRC inspection and inspection authority.

8. The inspection authority shall issue certificates and relevant reports as detailed in the contract. The said certificates and relevant reports shall be issued in (7) copies, for which (4) copies shall be handed over to the MRC and (3) copies shall be forwarded to the contractor.
9. The contractor shall prepare the inspection book for the equipment included all tests, certificates and shall be submitted to the owner with other documents (mechanical book…etc.).

10. In case of conflict points between the contract specifications and/or code requirement (referred to in the contract), the most stringent requirement shall be apply according MRC requirements.

11. The inspection authority shall constantly record of their inspection activities (as inspection plan or quality control plan), the record shall be available for the MRC at his request.

12. The contractor’s inspector’s team shall be responsible for full dimensional checking of items and for seeing that all points mentioned in these inspection requirements are observed. The contractor and/or manufacturer shall have own routine inspection activities for quality control which can be proceeded on their own free independent schedules regardless of the presence of the inspection authority it is to be understood that inspection authority activities (in shops or at site) do not relieve the contractor from contractual obligations like applying all inspection activities or test according code and standards or MRC requirements.

13. When ordering materials, equipment or machinery from suppliers and sub-suppliers which are subject to the inspection authority inspection the contractor and/or suppliers shall be clearly show on their order that the material and/or equipment is subject to inspection by the said authority ‘s inspector. Certificates and data folders...etc. required shall be also be specified in the order.

14. The compliance with the specifications contained in the contract documents will be the responsibility of the contractor in accordance with the terms of the contract.

15. The requisite number of copies of the vessel and exchanger data folders, pump test certificates and cures…etc., as called for in the purchase order requisition sheet shall be sent to the inspection authority and MRC as soon as possible after completion of manufacturing of the equipment.

16. Where material has been ordered and is not subject to inspection, it will be responsibility of the contractor to expedite the completion of data called for and to distribute that data.
17. The inspection authorities shall be present to witness all hydrostatic and performance tests. The inspection authority shall delegate its specially trained inspectors to the site or places where items included in the contract are being fabricated and/or assembled and erected to examine, Inspect, check, and witness tests, during all phases of fabrication and/or assembly, erected and construction of the plant to ensure its completes conformity with requirement of the contract.

18. Inspection certificates, shop test certificates, fabrication certificates performance test certificates and all other certificates issued by the inspection authority shall be fully detailed containing all the relevant data required and confirming that the item certified conforms to the requirements of the contract.

19. All certificates, reports…etc., issued by the inspection authority shall be in English language.

20. The inspection authority in addition to its certificates. Shall submit to MRC monthly progress report on its activities at the main manufactures work shop and mill. The inspection authority shall immediately inform MRC of any interruption, delay or difficulty. The contractor shall inform the inspection authority in writing at least one month before the dates of commencement of work on items processed or fabricated outside IRAQ. A copy of this notification shall be sent to MRC. The inspection authority shall accordingly be present at the exact date the perform manufactures mills and work to their required inspection duties.

21. The contractor shall send to the inspection authority all information necessary to carry out inspections activities for the equipment and materials such as a purchase order number, supplier’s author manufacture’s name. Expected time of delivery and specification work of the inspection there for the contractor shall be responsible for all coordination authority’s inspector and suppliers to ensure their presence at the places of the right time.

22. The working procedure with the inspection authority shall be established by the contractor within fourteen (14) days after the signing of the contact between MRC and contractor, and be submitted for approval.

23. The inspection procedure, manufacturer’s shop and at the site shall be established by the contractor and be submitted for MRC approval prior to the commencement of the inspection.

24. The contractor shall be responsible for the supply inspection and expediting of the materials and equipment required to complete the work and arrange for safe of the same to the job site.

25. For the equipment which does not required to be inspected by the inspection authority, the contractor shall be provide certificate of quality issued by the manufacture’s works.
26. The inspection authority may at its discretion or at the request of the contractor accept certificates of manufactures or other inspection authorities and has the right to waive certain inspection, or deviate from the contract inspection requirement subject to MRC approval thereof.

27. When Inspection and tests of equipment are completed the inspection authority shall issue the relevant inspection certificate certifying that the said equipment had been inspected by the inspection authority and its quality had met the requirements of the technical specifications mentioned in the contract.

28. All fabrication industries and manufacturing shops shall be certified by ASME qualified.

29. All fabricators and welders shall be ASME qualified according to ASME SEC IX.

30. The said working procedure with the inspection authority and the inspection procedure which satisfy the inspection authority requirements and approved by MRC shall be accepted by the contractor and without extra cost.

31. For the reason to the release of payment to the contractor, the inspection authority shall issue release notes to the contractor and to the MRC immediately after completion of the inspection authorities inspection for item or items stating that it or they had been tested, inspected by the inspection authority.

32. All material equipment and machinery inspected and certified by the inspection authority shall be clearly identified to have been so inspected and certified material or equipment and machinery subject to the inspection authority’s survey which do not bear the inspection authority’s identity shall be considered as not having been inspected and the MRC has the right to reject the said material, machinery and/or equipment, in case they have not been so identified through no fault of the inspection authority.

33. As soon as practical after the signature of the contract and prior to commencement of individual inspection the contractor shall provide to the inspection authority and the MR the inspection schedule of the items subject to inspection, giving the name and address of manufactures, suppliers…etc., And the estimated dates of commencement of inspection and times for fabrication…etc., and the extent of inspection for each individual item subject to inspection.

34. Data of fabrication indicated in the inspection schedule will be informative only, the contractor shall be responsible for notifying the inspection authority within (30) days before an approximate date of the beginning of the test of equipment or machinery and, to prices the time (5) working days before the actual starting of the testing.
35. If the contractor fails to carry out his duties under the clauses (32 and 33), the machinery and/or equipment subsequently not certified will at the MRC option be rejected. The contractor shall insure that the requirements of the clauses (32 and 33) thereof are included in the respected contracts with his sub-suppliers.

36. The inspection authority shall delegate to the site such number of inspection technical and engineers as the work requires. The decisions of the inspection authority for accepting are rejected the workmanship during construction shall be considered as final and the contractor shall accept such decision. It is to be understood that the inspection authority certificates does not relieve. The contractor from his contractual obligations. Contractor shall be provide the inspection authority with a minimum of two full sets of project documentation for construction at site.

37. The contractor shall be have an authorized inspectors team in both manufacturer shop and MRC site to be responsible to do or apply all inspection test activities according to the code and standard or MRC requirements and all the result shall be supported as reports supplied to MRC inspectors and inspection authority.

38. The MRC inspectors have the right to ask or order the contractor inspector to repeat any test or activities even they applied previously in successfully and the contractor shall be responsible to agree and to do it.

39. The test or inspection activities that the applied by MRC inspectors or inspection authority doesn't relies the contractor inspectors from his responsibilities to applied or do all inspections and test (shop and MRC site) as code and standards or MRC requirements.

40. The contractor will be responsible for to do all inspection activities and non – distractive test (NDT) in MRC site like (Ultrasonic radiographic ray) penetrate liquid for all equipment, the contractor will be responsible for all the cost of the above activities.

41. The contractor shall supply the results of the (NDT) examination as report to the MRC to make review and MRC have the right to accept or reject the result.
42. The activities of the inspection authority (IA) on the piping networks erection shall include, but not limited to the following activities during the site work (during erection stage)

   a. Performance of welders qualification tests for all welders (for a specific welding technique and welding position) engaged in the plant by the contractor and in accordance with approval standards mentioned in the contract and issuing certificates qualifying the welders to be engaged in the type of work required for a period of one year until the expiry of the work whichever is the lesser.

   b. The site inspectors shall make sure that the main pipelines and piping network are fabricated, erected and tested in accordance with the approval drawing and standards mentioned in the contract.

The following certificates and reports are required from the inspection authority:

   - Hydrostatic test pressure certificates
   - Radiographic examination reports
   - Test certificates for coating and warpping
   - Relief valves setting certificates
   - Reports on repair of defects

   c. Identification of the piping, fitting and attachments and discovering of transport damages.

   d. Checking of welding electrodes and wires on proper weather protection and storing.


   f. Checking and approval of weld repairs.

   g. Witnessing of hydrostatic test of pipelines

   h. Checking of pipe supports and expansion joints.
8. VENDOR LIST

Only vendors from USA, Western Europe, Japan, Canada and S. Korea are accepted. The following list is the preferred one for the equipment, bidder are requested to submit equipment vendors list attached with the technical offer and it will be subjected to MRC approval.

1. PUMPS

   HORIZONTAL CENTRIFUGAL TYPE, API
   DAVID BROWN UNION PUMPS
   UNION
   GOULDS
   KSB
   SULZER
   FLOWSERVE
   PUMP WORK
   SPX
   NUOVO
   SPP
   RUHHER

   VERTICAL SUMP TYPE
   FLOWER SERVE
   TORISHIMA
   STERLING FLUID SYSTEM
   PUMP WORK
   ITT - GOULDS

   SCREW PUMP
   ALLWEILER
   BOREMANN
   LEISTRIZ
2. ELECTRICAL EQUIPMENT

MEDIUM VOLTAGE & LOW VOLTAGE SWITCHGEAR

SIEMENS

SCHNEIDER ELECTRIC GROUP

ABB

WESTING HOUSE

FUJI ELECTRIC CO.LTD.

LS

LIGHTNING FIXTURES, PUSH BOTTOM DISTRIBUTION MATERIAL AND OTHER EXPLOSION PROOF MATERIAL

STAHL

Cooper Crouse-Hinds

LEGRAND

CABLES

BICC

CABLES PIRELLI

NEXSANS

TRATOS CAVI

CAMUNO CAVI

ELECTRICAL MOTORS (LOW VOLTAGE)

SCHORCH

ABB

BROOK

SIEMENS

UPS, BATTERY CHARGER AND BATTERIES

SAFT-NIFE

VARTA

CHLORIDE
3. **INSTRUMENTATION, SWITCHES AND SENSORS**

   **PLC**
   - YOKOGAWA
   - EMERSON
   - HONEYWELL
   - SIEMENS
   - ALLEN BRADLEY

   **CONTROL VALVES**
   - MASONEILAN
   - FISHER

   **INSTRUMENT TRANSMITTER, SWITCHES, SENSORS**
   - YOKOGAWA
   - EMERSON
   - HONEYWELL
   - FOXBORO
   - ENDRESS AND HOUSER

   **PRESSURE AND TEMPERATURE SWITCHES**
   - DELTA
   - UE
   - MERCOID
   - BARKSDAL
   - CELLA

   **SOLENOID VALVE**
   - ASCO
   - HERION

   **PRESSURE GAUGES AND DIAL THERMOMETER**
   - BUDENBERG
   - WIKA
   - NUOVAFIMA
   - RUEGER
   - ASHCRAFT

   **GLASS GAUGE**
   - KLINGER
   - TECHNOMATIC
4. PIPES AND FITTINGS (all origins are accepted except the chine's origin are not accepted)
   - TPS TECHNITUBE (DE)
   - OGTG (DE)
   - TC (FR)
   - PIETRA (IT)
   - KAWASAKI (JP)
   - THYSSEN MANNESMANN
   - US STEEL
   - VALLOUREC (FR)
   - TUBOS REUNIDOS
   - ERNE (GB)
   - BSL (FR)
   - NIPPON BENKAN KOGYOCO (JP)
   - BRUCK (DE)
   - IML (IT)
   - DELCORTE (FR)
   - SIDDRO (DE)

5. VALVES (all origins are accepted except the chine's origin are not accepted)
   - TROUVAY & CAUVIN
   - BABCOCK BORSIC
   - CRANE
   - ECONOSTO
   - ORION
   - VELAN
   - VITAS
   - ALCO
   - VOGT
   - KEYSTONE
6. SAFETY AND FIRE FIGHTING
   FIRE FIGHTING
   ANGUS
   ANSUL
   CACCIALANZA
   TFT
   MINIMAX
   SAFETY
   MSA
   DRAGER

7. LOADING ARMS AND FILLING MACHINES
   All origins are accepted, except Chine’s, Turkish and Indian origin are not accepted

8. THIRD PARTY INSPECTION
   BUREAU VERITAS
   DNV
   TUV
   ATG

9. STEEL STRUCTURE
   Only vendors from USA, Western Europe, Japan, Canada and S. Korea and Ukrainian are accepted.

10. PRINTERS
    HP
    CANON

11. OPERATOR AND ENGINEERING WORK STATION
    DELL PRECISION

12. LAPTOP
    GETAC
HEAVY PRODUCTS
TRUCKS LOADING STATION

CONTRACTOR COMMITMENTS
CONTRACTOR COMMITMENTS

HEAVY PRODUCTS TRUCKS LOADING STATION

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1. INTRODUCTION

MIDLAND REFINERIES COMPANY intend to design and construct a new heavy products trucks loading station to service lube oil board trucks loading activities at MIDLAND REFINERIES COMPANY- DAURA REFINERY SITE / BAGHDAD – IRAQ.

2. GENERAL

FORM THIS END THE CONTRACTOR SHOULD BE RESPONSIBLE FOR IMPLEMENTING THE FOLLOWING COMMITMENTS

A. All taxes, duties and other charges outside IRAQ shall be borne by CONTRACTOR.

B. All banking charges inside and outside Iraq except those associated with L/C issuance shall be paid by the contractor.

C. All taxes, duties, Levis outside Iraq shall be paid by the contractor.

D. The contractor shall be responsible for all insurance for marine or land.

E. Unloading at site shall be responsibility of the contractor.

F. Attend any call for meeting at a specified time and venue.

G. All queries and answers shall be distributed among bidders for transparency and clarity.

H. The contractor shall take the responsibility for unloading activities at the site (DAURA REFINERY)
3. ENGINEERING WORK AND DOCUMENTS

The contractor must take the responsibilities to accomplished the following items

A. ENGINEERING

Detailed engineering and detailed drawing and specification shall be according to the standard with process requirements and MRC requirements, the engineering work and the documents to be prepared by the contractor will includes but not limited to the following;

1.1 Process flow diagram
   Process flow diagram showing flow, pressure and temperature in all streams, heat and material balance should be attached with PFD.

1.2 Utility flow diagram with control philosophy and heat-material balance

1.3 Piping and instrument flow diagram (P & ID) for both process and utilities

1.4 Project specifications, which are the compile documents and drawings of all basically required condition from design to commissioning including design basis, design condition, engineering standards, recommended practice, local data, Codes, standard and regulation

1.5 Plot plane and layout, the plot plan shall show the location of equipment and machinery, Tie in at B.L., supporting structure and pipe racks, access and paving requirement, and main dimension

1.6 Equipment design
   The contractor shall design the equipment to be capable of meeting the specified process performance, as well as providing for safe economical and continues operation and ease of maintenance

   The contractor will be responsible for reviewing and approving manufacture’s details for fabrication drawings as required assuming conformance to process and mechanical design shop test and inspection schedule, summary sheet and design and test features will also be prepared by the contractor
1.7 Piping design
The contractor shall draw up the complete piping system required for process and utilities. Piping assembly and isometric drawings to be made on graphical bases with any attended detail required to clarify assembly drawings. The fabrication drawings to be made for the pipelines which are prefabricated at site and / or shop. In general, materials and design of piping to be based on standard for process specifications and MRC's requirements, piping classes and pipeline list shall be prepared by the contractor with appropriate break down.

1.8 Instruments design
The contractor shall be responsible to prepare complete specifications and requisition for all instruments and make drawings at least to the following extent;
A. Schedules of design data and installation for all control valves, indicating recording or controlling instruments and auxiliary facilities.
B. Assembly and installation drawings for instrument panel boards including list of materials.
C. Location drawings for all instruments points (which may be on piping drawings).
D. Lists of all material required for installing of equipment.
E. Installation drawing for instrumentation full work.
F. Summary and calculation sheets for flow meters.

1.9 Insulation design
The contractor shall prepare schedule for insulation, typical details and lists of material to be supplied to cover insulation of vessels, exchangers, pumps, and piping in accordance with design to process and design condition for the unit, piping insulation requirements should be indicated on suitable line table

1.10 Electrical design
The contractor shall design, specify and prepare inquiry requisition and complete installations drawings show diagrammatic layout, cable and conduit size and locations, starter location and mounting, typical connection and mounting typical connection and installation details, lighting system layout, details and earthing details.

Documents to be prepared for approval shall include the following at least:

a. Single line diagram (s) for power circuit.
b. Single line diagram (s) with metering, Relays, interlocks and indications.
c. Schematic diagram for M.V, L.V with gear and motor starter.
d. Area classification details.
e. Earthing layouts and earthing system calculations.

f. Cable schedules and layouts.

g. Short circuit calculations.

h. Lighting layouts and illuminate level calculations.

i. Motor layout

j. For each motor the following document shall be supplied:
   i. Test certificate including no — load current,
   ii. Instruction and maintenance manual data sheet.
   iii. Dimension drawing, stator winding drawing.

1.11 Painting design

The painting design shall include the following:


b. Instruction of prepare work.

c. Color code.

d. Bill of material.

1.12 Civil design

The design shall include the preparation of the followings:

a. General Arrangement drawing.

b. Equipment foundation drawing.

c. Grading and piles drawing where necessary.

d. Structure, pipe rack and building drawings.

e. Construction work drawing.

f. Bill of materials.

1.13 Welding design

The welding and welding design shall be according to the following:

a. All the welding processes shall be indicated according to AWS demonstration.

b. Detailed engineering of the welding procedure shall be given by the contractor which should include the following:
   • Edge preparation.
   • No. of passes gap limitation.
   • Electrode no. (AWS).
   • Heat treatment.
   • Examination and Test regulations.
B. SUPERVISION

The contractor shall specify the number of personal delegated for supervision (civil works, construction works, pre-commissioning and commissioning) of the plant and these supervision persons shall have certificate to approve that they have a good experience and authority everyone in his job.

C. MECHANICAL GUARANTEES

The contractor shall take the responsibility for the performance of the equipment and the material supplied for a period of 18 months from the date of issuance the provisional acceptance certificate.

D. PROCESS EQUIPMENT PERFORMANCE AND UTILITIES GUARANTEES

The contractor shall be responsible for meeting process and equipment performance guarantee under this control and utilities guarantees figure stated in the contract.

E. TECHNICAL REQUIREMENTS

The contractor shall have an inspectors team have a good experience and authorization to be responsible for doing and apply all inspection activities like (x-ray, visual inspection, dimensional check…etc.) in DAURA site according to the code and standard of MRC requirements, all inspection activities results shall be supported as a reports to the MRC inspector. The MRC inspectors have the right to except or reject the results.
F. TRAINING

The contractor shall specify the period and number of MRC personnel required for training on the operation, and maintenance of the unit (with special training for control system PLC & SCADA that used in the station).

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A. Onsite training for 4 persons with more details clarify later.

B. Training course.

Vendor shall be listed and describe all standard educational courses that available to owner by manual or DVDs.
G. PROCUREMENT

1. General

The contractor shall perform all procurement activities necessary for the equipment and materials supplying. The basic function of procurement services is to ensure that the required equipment and materials shall meet the appropriate specifications and reach the specified field construction work schedule and in good conditions, in general procurement services shall include the following, placing orders, checking vendor drawings, expediting shop inspection including packing inspection, transportation up to (CIP Baghdad – DAURA refinery) including necessary insurance custom clearance service.

2. Procurement main objectives,

A. Procurement shall be forming the most capable sources of supply, to ensure good quality of products and delivery.
B. Preparation of delivery schedule of equipment and material to meet filled construction programs.
C. Cooperation inspection and expediting activities.
D. Preparation of tabulated technical reports related to equipment and materials to be supplied for the works and.
E. Prevision of information and statistics regarding purchase and transportation to MRC representative.

H. EXPEDITING

The contractors supervisory regarding expediting shall involve the following activities

1. In-site expediting at equipment material and services to ensure that the promised (appointed delivery dates) are maintained
2. Expecting, the movement of equipment and materials from concerned suppliers work shop or store to the shipping points (CIP/Baghdad – DAURA refinery)
3. Preparation, maintenance and publication of periodic reports regarding equipment and materials status
4. Taking care to ensure that equipment and materials are properly packed, loaded on board and securely stored in order to minimize the possibility of damage in transportation.
5. Carrying out periodic evaluations of supplier’s workshops, Facilities and quality control system to ensure that they maintain the capacity to supply products of good quality on schedule
6. A sequence depiction diagram of expediting work flow shall be give monthly to MRC monthly.
I. PACKING

1. General

The contractor is fully responsible to ensure suitable packing. The packing shall be suitable for protecting materials against weathering land and marine agents in order to prevent corrosion or rust of those parts which are most subject to damages and needing special care.

In addition, packing shall be suitable for various loading and unloading operations due to material transportation from the point of shipment to the place of installation, and shall guaranteed protection of its content, not only during expected time of content and transport but also for any outdoor storage over a period of at least six months.

All packed material inside cases shall be suitably secured to avoid movement during, transport. In case of materials treated with protective compound, the contractor and/or supplier shall state the expired date of protection and shall supply all necessary instructions for collect presentation of the material.

Special care shall be taken to protect the materials which are particularly subject to deterioration due to the humidity such as switching boards, various electrical instrument, welding electrode…etc.

2. Marking

Each case shall be marked on three sides, that is to say on two side faces and on the cover, depending on the material characteristics packages shall be marked indelible paint, any indications necessary for correct handling such as the center of gravity and lifting point Marking for transport overseas shall be carried out in the English language (top, triangle handle with care…etc.).

For packing, where marking is not possible, at least two metallic names Plate shall be fitted marketing on these plates will be by means of engraving on indelible paint.

For both marking on case or name plate it will include the following:

- Name and address of destination.
- Project or plan (name).
- Package number.
- Gross weight (kg), Net weight (kg) and Dimension .......... X ........... X ......m².

The contractor and/or the supplier will be responsible for all damage resulting from incorrect or insufficient marking.
3. Packing list

The contractor or supplier will insert in each package a list of contents (packing list) which shall always show:

- Purchase order number,
- Number of packages,
- Type of material, quantities and order item number,
- Gross and net weight and,
- Any other markings as specified on the order.

The packing list and any other documents will be put in closed polythene envelope and included in each package. A second copy of the packing list will be placed in a polythene envelop by means of a metallic plate bearing the inscription "DOCUMENTS" for columns, exchanger, drums and tanks, the envelop will be placed in a nozzle identified by any arrow in indelible paint followed by the word "DOCUMENTS" Shipping documentation shall always be presented in the number of copies as shown on the order.

J. DOCUMENTS AND DRAWINGS

The contractor should provide the following manuals and catalogs in (6 hard copies and 6 electronic copies DVD).

1. Operating manual

Which shall contain all the requested instructions and attachment in order to permit a safe and a correct start-up, shut-down, emergency shut-down, and analysis. Lubrication and maintenance schedules and chemicals

2. Mechanical manual

Which shall contain the information for all mechanical and electrical equipment included in the supply

3. Equipment manual

Which shall contain process and engineering drawings together with the technical information relevant to all equipment and materials included in the supply such as foundation, sewer system, structure drawing…etc.
4. Inspection book
   Which to contain all documents related to inspection and tests for all equipment and
   materials included in supply

5. Software manual
   Software manual for PLC which shall contain the information for all software and program
   used in PLC
   In addition to standard hardware and software documentation vendor will supply four (4)
   sets of the following:

   A. Field I/O Wire Lists in point ID order.
   B. Loop wiring diagrams generated by loop ordering computer software.
   C. Application and custom program descriptions and source listings.
   D. Memory maps.
   E. Logic document for projects PLC using in Unit.
   F. Recommended spare parts list with spare parts number.
   G. Documentation will be up dated to the level at time of shipment, free of errors.
   H. Instrument loop diagram.
   I. Instrument location plan diagram.
   J. Instrument junction box diagram.
   K. Control panel diagram.
   L. Local instrument diagram.
   M. Control logic diagram.

6. Final drawing
   All final drawings to be presented in electronic format (CD and DVD) as well as paper form.

7. Bidding details
   A. All pages shall be standard 210mm x 297mm size or multiples thereof. Drawings
      larger than 297mm x 420mm should be folded and inserted in individual 210mm x
      297mm, pockets.

   B. The documents relevant to each of the following manuals (operating manual,
      equipment manual, and Inspection book) shall be bound in several volumes number
      sequentially and arranged in clear sequence.