

TENDER DOCUMENTS FOR
HIRING THE SERVICES OF PCC CONTRACTOR FOR
SUPPLY / INSTALLATION / CIVIL FOUNDATIONS FOR MISCELLANEOUS
EQUIPMENTS & PLANT BUILDING WORKS FOR MELA DEVELOPMENT PROJECT
(PCC)

TENDER EQUITY NO. PROC-FC/CB/PROJ/MELA-3368/2018)

ADDENDUM NO.1

This Addendum No. 1 is hereby made a part of the subject Tender Document and is being issued to modify, explain and/or correct the Tender Document. This addendum, including all articles and attachments listed below, shall be taken into account in preparing the Bid for the subject Tender.

Document Reference	Description of Amendment/Addition
1) 165-2-BQM-001	Rev.0 of 165-2-BQM-001 attached with the original tender (Vol-II) shall be superseded by Rev.1 of the same document, enclosed as Attachment-I to this Addendum No. 1.
2) 165-2-SPM-042, Rev. 1	Rev.0 of 165-2-SPM-042 attached with the original tender (Vol-II) shall be superseded by Rev.1 of the same document, enclosed as Attachment-II to this Addendum No. 1.
3) 165-2-BQM-001, Rev. 1 165-2-BQM-002, Rev. 0 165-2-BQC-001, Rev. 0 165-2-BQC-002, Rev. 0 165-2-BQE-001, Rev. 0 165-2-BQE-002, Rev. 0 165-2-BQE-003, Rev. 0 165-2-BQE-004, Rev. 0 165-2-BQE-005, Rev. 0 165-2-BQE-006, Rev. 0 165-2-BQE-007, Rev. 0 165-2-BQI-001, Rev. 0	Bill of Quantities (Excel sheets) can be downloaded from the OGDCL website enclosed as Attachment-III to this Addendum No. 1. Bidder to note that Bill of quantities are protected files bidder to fill price only in unprotected cells, un protection of BOQ by bidder lead to disqualification.

ATTACHMENT – I

**BOQ/BID PRICE SCHEDULE FOR SUPPLY &
INSTALLATION OF MECHANICAL / FIRE FIGHTING /
COMPANY SUPPLIED EQUIPMENT & PACKAGES**



Zishan Engineers (Pvt.) Ltd.

An ISO 9001-2015 certified company,
47/F, Block 6, PECHS, Karachi-Pakistan
Tel: (92-21) 34393045-48 & 34310151-54
Fax: (92-21) 34533430 & 34310156
E-mail : contact@zishanengineers.com,
Web : www.zishanengineers.com

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OIL & GAS DEVELOPMENT COMPANY LTD.

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Rev.	Date	Description	Prepared By	Checked By	Approved By
1	04-07-2018	Re-Issued for Tender	MAS	MIAH	SH
0	04-06-2018	Issued for Tender	MAS	MIAH	SH

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ITEM	DESCRIPTION	QTY.	UNIT	Supply					Services				Total Amount (Supply + Services) (Pak. Rs.)	REMARKS	
				Unit Rate (Pak Rs.)	Total Supply (Pak Rs.)	GST on Supply items (Pak. Rs.)	Total Supply inclusive of GST	Third Party Pre Shipment Inspection (Pak. Rs.)	Total Supply inclusive of GST & Pre-Shipment Inspection	Unit Rate (Pak Rs.)	Total Services (Pak Rs.)	GST & Provincial tax on Services (Pak.Rs.)			Total Services inclusive of GST & Provincial Tax on Services (Pak.Rs.)
					A	B	C = A+B	D	E = C+D		F	G			H = F+G
1.0	INSTRUMENT AIR PACKAGE														
1.1	SUPPLY OF MATERIAL, FABRICATION, INSTALLATION, ERECTION, TESTING AND COMMISSIONING OF INSTRUMENT AIR RECEIVER VESSEL (3000-V330B) AS PER REFERENCE DOCUMENTS AND APPLICABLE STANDARDS COMPLETE IN ALL RESPECT. REFERENCE DOCUMENTS : 165-2-DSM-114 165-2-MPV-101	1	NOS.												WEIGHTS GIVEN ARE APPROXIMATE AND FOR BIDDING PURPOSE ONLY. FINAL WEIGHTS WILL BE PROVIDED WITH "ISSUED FOR CONSTRUCTION" DRAWINGS TO THE SUCCESSFUL BIDDER
1.2	INSTALLATION, TESTING, CLEANING AND COMMISSIONING OF INSTRUMENT AIR PACKAGE IN ACCORDANCE WITH DRAWINGS, SPECIFICATIONS, RELEVANT STANDARDS AND AS DIRECTED BY OWNER'S REPRESENTATIVE, COMPLETE IN ALL RESPECT. REFERENCE DOCUMENTS : 165-2-PID-107 SEE VENDOR'S DATA FOR INSTRUMENT AIR SYSTEM IN SUPPLEMENTARY TECHNICAL DOCS OF SECTION-V OF TENDER DOCS.	1	L.S												INSTRUMENT AIR SYSTEM IS FREE ISSUED ITEM EXCEPT 3000-V330B INSTRUMENT AIR RECEIVER VESSEL WHICH IS IN CONTRACTOR'S SCOPE AND INSTALLATION OF COMPLETE INSTRUMENT AIR PACKAGE IS CONTRACTOR'S RESPONSIBILITY.
2.0	GAS ENGINE DRIVEN RECIPROCATING COMPRESSOR PACKAGE														
2.1	INSTALLATION, TESTING AND COMMISSIONING ASSISTANCE OF COMPRESSORS AS PER THE DOCUMENTS REFERENCE DOCUMENTS : SEE VENDOR'S DATA FOR GAS ENGINE DRIVEN RECIPROCATING COMPRESSOR PACKAGE IN SUPPLEMENTARY TECHNICAL DOCS OF SECTION-V OF TENDER DOCS.	3	NOS.												
3.0	TANKAGE														
3.1	FIRE WATER TANK T-3501 SUPPLY OF MATERIAL, FABRICATION, WELDING, INSTALLATION, TESTING, CLEANING, BOX-UP AND COMMISSIONING OF 1 NO. 12.190 m DIA. X 13.000 m Height FIRE WATER TANK (T-3501), IN ACCORDANCE WITH DRAWINGS, SPECIFICATIONS, RELEVANT STANDARDS AND AS DIRECTED BY OWNER'S REPRESENTATIVE, COMPLETE IN ALL RESPECT. THE WORKS INCLUDE THE FOLLOWING: REFERENCE DOCUMENTS : 165-2-PID-109 (SHEET 2 OF 4) 165-2-MST-3501 165-2-DSM-110														THE RATES OF ITEM B (ALL PARTS), F (ALL PARTS) & D IN S.NO. 1.1.1 SHALL BE INCLUSIVE OF SURFACE PREPARATION & PAINTING AS PER PAINTING SPECIFICATION. WEIGHTS GIVEN ARE APPROXIMATE AND FOR BIDDING PURPOSE ONLY. FINAL WEIGHTS WILL BE PROVIDED WITH "ISSUED FOR CONSTRUCTION" DRAWINGS TO THE SUCCESSFUL BIDDER
a)	ROOF PLATES	6,731	KG.												
b)	ROOF STRUCTURE	4,271	KG.												
c)	SHELL PLATES	27,823	KG.												
d)	CURB ANGLE	349	KG.												
e)	BOTTOM PLATES	10,327	KG.												
f)	TANK NOZZLES AND APPURTENANCES INCLUDING THE FOLLOWING:	3,207	KG.												
i)	SHELL AND ROOF MANHOLES														
ii)	SHELL AND ROOF NOZZLES														
iii)	PRODUCT DRAW-OFF WITH INTERNAL PIPES & NAME PLATE														
g)	SPIRAL STAIRCASE AND HAND RAIL	1,692	KG.												
	SUB TOTAL FOR T-3501	54,400	KG												

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					A	B	C = A+B	D	E = C+D		F	G	H = F+G		
3.2	DIESEL DAY TANK (T-4001) SUPPLY OF MATERIAL, FABRICATION, WELDING, INSTALLATION, TESTING, CLEANING, BOX-UP AND COMMISSIONING OF 1 NO. 2.788 m LENGTH x 1.738 m WIDTH x 1.834 m HEIGHT DIESEL DAY TANK (T-4001) , IN ACCORDANCE WITH DRAWINGS, SPECIFICATIONS, RELEVANT STANDARDS AND AS DIRECTED BY OWNER'S REPRESENTATIVE, COMPLETE IN ALL RESPECT. THE WORKS INCLUDE THE FOLLOWING: REFERENCE DOCUMENTS : 165-2-PID-108 165-2-MST-4001 165-2-DSM-113														THE RATES OF ITEMS STIFFENER, LADDER PLATFORM MATERIAL, NOZZLES & APPURTENANCES (all parts) , CURB ANGLE SHALL BE INCLUSIVE OF SURFACE PREPARATION & PAINTING AS PER PAINTING SPECIFICATION. WEIGHTS GIVEN ARE APPROXIMATE AND FOR BIDDING PURPOSE ONLY. FINAL WEIGHTS WILL BE PROVIDED WITH "ISSUED FOR CONSTRUCTION" DRAWINGS TO THE SUCCESSFUL BIDDER
a)	ROOF PLATES	484	KG.												
b)	SHELL PLATES	1,574	KG.												
c)	CURB ANGLE	102	KG.												
d)	BOTTOM PLATES	533	KG.												
e)	STIFFENER ANGLE	409	KG.												
f)	SUPPORTED BEAM	195	KG.												
g)	TANK NOZZLES AND APPURTENANCES INCLUDING THE FOLLOWING:	279	KG.												
i)	SHELL AND ROOF MANHOLES														
ii)	SHELL AND ROOF NOZZLES														
iii)	PRODUCT DRAW-OFF WITH INTERNAL PIPES														
iv)	NAME PLATE														
h)	LADDER, PLATFORM AND HAND RAIL	74	KG.												
	SUB TOTAL FOR T-4001	3,650	KG												
3.3	SUPPLY OF ALL MATERIALS, INSTALLATION AND TESTING OF FLOAT TYPE LEVEL INDICATOR FOR FOLLOWING TANKS, COMPLETE IN ALL RESPECTS AS PER RELEVANT DOCUMENT: REFERENCE DOCUMENTS : 165-2-DSI-005														
a)	12.190 m DIA. x 13.000 m HEIGHT	1	NOS.												
b)	2.788 M LENGTH X 1.738 M WIDTH x 1.834 M HEIGHT	1	NOS.												
3.4	VACUUM BOX TESTING OF BOTTOM FOR THE FOLLOWING TANKS:														CONTRACTOR TO SUBMIT PROCEDURE FOR APPROVAL FROM OWNER.
a)	12.190 m DIA. x 13.000 m HEIGHT	1	NOS.												
b)	2.788 M LENGTH X 1.738 M WIDTH x 1.834 M HEIGHT	1	NOS.												
3.5	HYDROSTATIC TESTING OF FOLLOWING TANKS:														ARRANGEMENT OF WATER FOR HYDROSTATIC TESTING OF TANK IS CONTRACTOR'S RESPONSIBILITY.
a)	12.190 m DIA. x 13.000 m HEIGHT	1	NOS.												
b)	2.788 M LENGTH X 1.738 M WIDTH x 1.834 M HEIGHT	1	NOS.												

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					A	B	C = A+B	D	E = C+D		F	G			H = F+G
3.6	CALIBRATION OF FOLLOWING TANKS : (USING OPTICAL LINE METHOD). (WITH APPROVAL FROM PWD)														CONTRACTOR TO SUBMIT PROCEDURE FOR APPROVAL FROM THE OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR GETTING NECESSARY APPROVALS FROM PWD AND RELEVANT DEPARTMENTS. CALIBRATION SHALL BE PERFORMED BY REPUTABLE THIRD PARTY AGENCY PREFERABLY SGS. ANY OTHER AGENCY NOMINATED FOR CALIBRATION SHALL FIRST BE APPROVED FROM OWNER. CHARGES OF THIRD PARTY AGENCY SHALL BE AT CONTRACTOR'S EXPENSE
a)	12.190 m DIA. x 13.000 m HEIGHT	1	NOS.												
b)	2.788 M LENGTH X 1.738 M WIDTH x 1.834 M HEIGHT	1	NOS.												
3.7	SUPPLY OF ALL MATERIALS, SURFACE PREPARATION BY SAND BLASTING TO S.A. 2 1/2 AND PAINTING OF TANKS WHICH INCLUDES 2 COATS OF RED OXIDE (LEAD FREE) PRIMER (40-45 MICRONS EACH) FOLLOWED BY TWO COATS OF ALKYD ENAMEL (20-25 MICRONS EACH) GIVING A TOTAL DRY FILM THICKNESS (DFT) OF 125 MICRONS MINIMUM ON EXTERNAL SURFACES (INCLUDING ALL NOZZLES ETC.) OF THE FOLLOWING TANK ACCORDING TO SPECIFICATIONS AND TO THE ENTIRE SATISFACTION OF THE OWNER'S REPRESENTATIVE.														FOR DETAIL SEE SPECIFICATION 165-2-SPM-013
a)	12.190 m DIA. x 13.000 m HEIGHT (1 NO.S)	650	SQ.M												
b)	2.788 M LENGTH X 1.738 M WIDTH x 1.834 M HEIGHT (1 Nos.)	32	SQ.M												
3.8	SUPPLY OF ALL MATERIALS, SURFACE PREPARATION BY SAND BLASTING TO S.A. 2 1/2 AND APPLICATION OF 3 COATS OF COALTAR EPOXY (125 MICRONS EACH) GIVING A TOTAL DRY FILM THICKNESS OF 375 MICRONS. ON UNDER SIDE OF BOTTOM PLATES AND INTERNAL PAINTING ON INSIDE OF TANK SHELL HEIGHT FOR THE FIRE WATER TANK.														FOR DETAIL SEE SPECIFICATION 165-2-SPM-013
a)	12.190 m DIA. x 13.000 m HEIGHT (1 NO.S)	175	SQ.M												
3.9	SUPPLY OF ALL MATERIALS, SURFACE PREPARATION BY SAND BLASTING TO S.A. 2 1/2 AND APPLICATION OF 3 COATS OF EPOXY ULTRABUILD LINER (125 MICRONS EACH) GIVING A TOTAL DRY FILM THICKNESS OF 375 MICRONS. ON UNDER SIDE OF BOTTOM PLATES AND INTERNAL PAINTING ON 1 METER OF SHELL HEIGHT FOR THE FOLLOWING TANK														
a)	2.788 M LENGTH X 1.738 M WIDTH x 1.834 M HEIGHT (1 Nos.)	25	SQ.M												
4.0	FIREWATER & FIREFIGHTING SYSTEM THE SUPPLIED FIRE WATER EQUIPMENT SHALL COMPLY WITH THE FOLLOWING DOCUMENTS ATTACHED. ANY DEVIATION SHALL BE CLEARLY HIGHLIGHTED & JUSTIFIED BY THE SUPPLIER. REFERENCE DRAWING NO.S: 165-2-PID-109 (FIRE WATER SYSTEM) 165-2-MPD-001 (TYPICAL DETAILS OF FIRE HYDRANT AND MONITOR) REFERENCE DATA SHEETS & SPECIFICATIONS 165-2-SPM-035 (SPECIFICATION FOR FIRE FIGHTING SYSTEM). 165-2-SPM-041 (SPECIFICATION FOR MOBILE FOAM UNITS). 165-2-DSM-111 (DATA SHEET FOR FIRE HYDRANTS). 165-2-DSM-112 (DATA SHEET FOR FIRE MONITORS).														
4.1	FIRE WATER HYDRANTS: SUPPLY & INSTALLATION, ERECTION, TESTING AND COMMISSIONING OF FIREWATER HYDRANTS AS PER DATA SHEET NO. 165-2-DSM-111.	12	NOS.												

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					A	B	C = A+B	D	E = C+D		F	G	H = F+G			I=E+H
4.2	FIRE FOAM MONITORS: SUPPLY & INSTALLATION, ERECTION, TESTING AND COMMISSIONING OF FIRE FOAM MONITORS AS PER DATA SHEET NO. 165-2-DSM-112.	13	NOS.													
4.3	MOBILE FOAM UNITS: SUPPLY & INSTALLATION, ERECTION, TESTING, PLACEMENT AND COMMISSIONING OF TROLLEY MOUNTED MOBILE FOAM UNITS AS PER SPECIFICATION 165-2-SPM-041.	8	NOS.													
4.4	FIXED FOAM UNITS FOR STORAGE TANKS: SUPPLY & INSTALLATION OF SKID BASED FIXED FOAM UNITS WITH BLADDER TANK, PROPORTIONATER, PIPING, INSTRUMENTATION ETC. COMPLETE IN ALL RESPECTS.	1	NOS.													
4.5	FOAM POURER / CHAMBER FOR TANKS: SUPPLY & INSTALLATION OF 4" 150#, RF FOAM POURER ASSEMBLY AND NOZZLE AND PIPING CLEATS AND ALL REQUIRED TESTING AS PER API-653 FOR FOLLOWING TANKS, IN ACCORDANCE WITH RELEVANT STANDARDS AND AS DIRECTED BY OWNER'S REPRESENTATIVE, COMPLETE IN ALL RESPECTS AS PER SITE CONDITION REFERENCE DOCUMENT: 165-2-DSM-115 165-2-MST-003 165-2-MST-004															CONTRACTOR TO SUBMIT PROCEDURE FOR INSTALLATION & TESTING FOR APPROVAL FROM OWNER ALONGWITH THE BID DOCUMENTS.
a)	13.716 m DIA. x 9.010 m HEIGHT	6	NOS.													
b)	18.288 m DIA x 12.192 m HEIGHT	2	NOS.													
4.6	COOLING WATER SPRAY SYSTEM FOR TANKS: SUPPLY & INSTALLATION OF COOLING WATER SPRAY SYSTEM & ALL REQUIRED TESTING AS PER API-653 FOR FOLLOWING TANKS, IN ACCORDANCE WITH RELEVANT STANDARDS AND AS DIRECTED BY OWNER'S REPRESENTATIVE, COMPLETE IN ALL RESPECTS AS PER SITE CONDITION REFERENCE DOCUMENT: 165-2-MST-001 165-2-MST-002															CONTRACTOR TO SUBMIT PROCEDURE FOR INSTALLATION & TESTING FOR APPROVAL FROM OWNER ALONGWITH THE BID DOCUMENTS.
a)	13.716 m DIA. x 9.010 m HEIGHT	6	NOS.													
b)	18.288 m DIA x 12.192 m HEIGHT	2	NOS.													
4.7	HOSE CABINET: SUPPLY & INSTALLATION OF FIRE HOSE CABINETS, FLOOR STANDING TYPE, MIN. 4' x 4' x 10' , FABRICATED FROM 16 SWG SHEET, CAPABLE OF HOLDING:	8	NOS.													
a)	2 NOS. HOSE REELS 2-1/2" ND x 30M LONG.															
b)	1NO. FOAM MAKING BRANCH WITH PICK-UP TUBE															
c)	1NO. TRIPLE PURPOSE NOZZLE.															
4.8	HOSE REEL: SUPPLY & INSTALLATION OF FIRE HOSE REELS OF 2-1/2" ND x 30 M LONG, WITH EXPANSION RING TYPE COUPLING MALE AND FEMALE TYPE ON EACH END RESPECTIVELY. HOSE TO BE NEOPRENE LINED AND COVERED WITH AN OIL ABRASIVE RESISTANT NEOPRENE OR PLASTIC COATING, HOSE SHALL BE SUITABLE FOR 200 PSIG PRESSURE.	16	NOS.													
4.9	BRANCH PIPE: SUPPLY & INSTALLATION, PLACEMENT OF SELF INDUCTING FOAM MAKING BRANCH PIPE RATED AT 50GPM AT 7 BARG HYDRANT PRESSURE WITH A THROW OF 40M SUITABLE FOR CONNECTION WITH 2-1/2" DIA. QUICK/INSTANTANEOUS TYPE COUPLING.	8	NOS.													

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					A	B	C = A+B	D	E = C+D		F	G	H = F+G		I=E+H
4.10	TRIPLE PURPOSE NOZZLE: SUPPLY & INSTALLATION OF TRIPLE PURPOSE NOZZLE FOR JET SPRAY AND FOG, RATED AT 80M3/HR. AT 7 BARG AND THROW OF 40M, SUITABLE FOR 2-1/2" DIA. QUICK/INSTANEOUS TYPE COUPLING.	8	NOS.												
4.11	FIRE EXTINGUISHERS														
4.11.1	SUPPLY & INSTALLATION AND PLACEMENT OF PORTABLE FIRE EXTINGUISHERS ABC, DRY CHEMICAL, NIPPON PAN-20 SD OR EQUIVALENT, POWDER TYPE COMPLETE WITH ALL ACCESSORIES & INITIAL CHARGE IN FOLLOWING CAPACITIES: 6 Kg.	5	NOS.												
4.11.2	SUPPLY & NSTALLATION AND PLACEMENT OF PORTABLE FIRE EXTINGUISHERS, CO2, NIPPON NC-7 OR EQUIVALENT, COMPLETE WITH ALL ACCESSORIES AND INITIAL CHARGE IN FOLLOWING CAPACITIES: 5 Kg.	5	NOS.												
4.11.3	SUPPLY & INSTALLATION AND PLACEMENT OF TROLLEY MOUNTED FIRE EXTINGUISHERS, DRY CHEMICAL POWDER TYPE COMPLETE WITH ALL ACCESSORIES & INITIAL CHARGE IN FOLLOWING CAPACITIES: 50 Kg.	2	NOS.												
5.0	SUPPLY & INSTALLATION AND PLACEMENT OF FIRE BLANKETS	10	NOS.												
6.0	SUPPLY & INSTALLATION AND PLACEMENT OF SAND BUCKETS (SAND FILLED) WITH STANDS AND SHOVELS.	8	NOS.												
7.0	AFFF FOAM CONCENTRATE 200 LITRE DRUM FOR WATER/FOAM MONITORS.	4	NOS.												
8.0	SUPPLY AND INSTALLATION OF SPRINKLERS FOR 8 X EXISTING CONDENSATE STORAGE TANKS AS PER DATASHEETS 165-2-DSM-117 (SPRINKLER DATASHEET).	1	LS												
9.0	PUMPS														
9.1	DIESEL ENGINE DRIVEN FW PUMP (P-3501 A/B & 3502) INSTALLATION, ERECTION, TESTING & COMMISSIONING OF FIRE WATER PUMP, DIESEL ENGINE DRIVEN, MOUNTED ON A COMMON BASE FRAME COMPLETE WITH COUPLING, CONTROL PANEL AND ACCESSORIES AS PER THE FOLLOWING DOCUMENTS / DRAWINGS ATTACHED: REFERENCE DOCUMENTS: 165-2-PID-109 (SHEET 2 OF 4) SEE VENDOR'S DATA FOR PUMPS IN SUPPLEMENTARY TECHNICAL DOCS OF SECTION-V OF TENDER DOCS.														
a)	1500 GPM	1	NOS.												
b)	750 GPM	2	NOS.												
9.2	FIRE JOCKEY PUMP (P-3503 A/B) INSTALLATION, ERECTION, TESTING & COMMISSIONING OF CENTRIFUGAL PUMP, ELECTRIC MOTOR DRIVEN, MOUNTED ON A COMMON BASE FRAME COMPLETE WITH COUPLING AND ACCESSORIES AS PER THE FOLLOWING DOCUMENTS / DRAWINGS ATTACHED: REFERENCE DOCUMENTS: 165-2-PID-109 (SHEET 2 OF 4) SEE VENDOR'S DATA FOR PUMPS IN SUPPLEMENTARY TECHNICAL DOCS OF SECTION-V OF TENDER DOCS.	2	NOS.												

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					A	B	C = A+B	D	E = C+D		F	G	H = F+G		
9.3	ELECTRIC MOTOR DRIVEN FIRE WATER TANK FILLING PUMP (P-3505 A/B) SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF FOLLOWING CENTRIFUGAL PUMPS COMPLETE WITH MOTOR ASSEMBLIES AND CONTROL PANEL (MOUNTED ON COMMON BASE PLATE) ON RCC FOUNDATIONS. JOB INCLUDES SHIFTING, PLACING IN POSITION, LEVELING, GROUTING, ALIGNMENT, TESTING AND COMMISSIONING OF THE PUMP FOR TROUBLE FREE WORKING INCLUDING COLD & HOT ALIGNMENT CHECKS & WITH FOLLOWING SPECIFICATION FLOWRATE : 425 GPM DIFFERENTIAL HEAD : 35 PSIG REFERENCE DOCUMENT : 165-2-DSM-116 165-2-PID-109 (SHEET 1 OF 4)	2	NOS.												
10.0	RADIOGRAPHIC INSPECTION OF WELDS:														
a)	15 INCH. FILM	-	NOS.												ONLY FOR RATES
b)	10 INCH. FILM	-	NOS.												ONLY FOR RATES
10.1	ELECTRIC MOTOR DRIVEN DIESEL TRANSFER PUMPS (P-4001 A/B) SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF FOLLOWING CENTRIFUGAL PUMPS COMPLETE WITH MOTOR ASSEMBLIES AND CONTROL PANEL (MOUNTED ON COMMON BASE PLATE) ON RCC FOUNDATIONS. JOB INCLUDES SHIFTING, PLACING IN POSITION, LEVELING, GROUTING, ALIGNMENT, TESTING AND COMMISSIONING OF THE PUMP FOR TROUBLE FREE WORKING INCLUDING COLD & HOT ALIGNMENT CHECKS & WITH FOLLOWING SPECIFICATION FLOWRATE : 10 GPM DIFFERENTIAL HEAD : 40 PSIG REFERENCE DOCUMENT : 165-2-DSM-108 165-2-PID-108	2	NOS.												
11.0	FIXED SKID MOUNTED SCRAPER LAUNCHER materials, manufacture, fabrication, assembly, inspection, non-destructive examination, testing and painting.SUPPLY, MANUFACTURE / FABRICATION, INSTALLATION, ASSEMBLY, INSPECTION, TESTING, PAINTING & COMMISSIONING OF SKID MOUNTED 8" x 10" FIXED SCRAPER LAUNCHER SKID ALONGWITH ITS COMPLETE PIPING AND INSTRUMENTATION. REFERENCE DOCUMENT: 165-2-SPM-042 165-2-MPV-001	1	NOS.												
12.0	MISCELLANEOUS FOLLOWING ITEMS ARE REQUIRED WITH THE ABOVE ITEMS:														
a)	START-UP AND COMMISSIONING SPARES (UNIT/SYSTEM WISE LIST WITH ITEM-WISE PRICES TO BE ATTACHED)	1	L.S												
b)	SUPPLY OIF TWO (02) YEARS RECOMMENDED SPARE PARTS.	1	L.S												
c)	SUPPLY OF OPERATIONAL CONSUMABLE (DETAILS WITH ITEM-WISE PRICES TO BE ATTACHED)	1	L.S												OPTIONAL
TOTAL (Rs.)															

Note:

- (1) All taxes shall be payable by contractor.
- (2) The quantities mentioned in the BOQs are indicative and may change as detail design progresses. The bid evaluation will be carried out considering the quantities given in BOQs and unit rates quoted by the Bidders.
- (3) Copy of the SRO 678 (1)/2007 is given in **Annexure-XV** and CGO List given in **Attachment-IV** of ITB.
- (4) Vendor to fill the price in unprotected cells, unprotection of BOQ by bidder lead to disqualification.
- (5) Test certificates and MTC's of all items (where applicable) shall be provided.
- (6) The charges shall be supported by verified quotation of Inspection Agency.

ATTACHMENT – II

SCOPE OF SUPPLY AND SPECIFICATION
FOR SKID MOUNTED SCRAPER LAUNCHER



Zishan Engineers (Pvt.) Ltd.

An ISO 9001-2015 certified company,

47/F, Block 6, PECHS, Karachi-Pakistan

Tel: (92-21) 34393045-48 & 34310151-54

Fax: (92-21) 34533430 & 34310156

E-mail : contact@zishanengineers.com.

Web : www.zishanengineers.com

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OIL & GAS DEVELOPMENT COMPANY LTD.

MELA DEVELOPMENT PROJECT

SCOPE OF SUPPLY AND SPECIFICATION FOR SKID MOUNTED SCRAPER LAUNCHER



Rev.	Date	Description	Prepared By	Checked By	Approved By
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ABBREVIATIONS

ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
BS	British Standard
DCS	Distributed Control System
EEMUA	The Engineering Equipment and Materials Users Association
IEC	International Electro technical Committee
ISO	International Standards Organization

1.0 **INTRODUCTION**

1.1 **Scope**

This specification defines the scope of supply and minimum requirements for the manufacture, inspection and testing of fixed scraper launcher complete with all instruments, piping and associated facilities, to be installed at OGDCL Mela site. The package skid, which supports the equipment, shall also support all other accessories, piping, instrumentation, etc.

1.2 **Definitions**

Following definitions apply throughout this document:

- **COMPANY:** Oil & Gas Development Company (OGDCL)
- **CONSULTANT:** M/s. Zishan Engineers (Pvt.) Ltd. (ZEL).
ZEL have been awarded the work of Engineering, Procurement Assistance and Project Management.
- **CONTRACTOR:** Means the construction company to be engaged by the COMPANY to perform the construction work.
- **PACKAGER:** The organization, firm or agency with whom order for the supply of equipment and or material has been placed. PACKAGER shall be solely responsible for the quality and satisfactory performance of all the items included in his scope of supply.

1.3 **Errors or Omissions**

- 1.3.1 The review and comment by the COMPANY of any PACKAGER's drawings, procedures or documents shall only indicate acceptance of general requirements and shall not relieve the PACKAGER of its obligations to comply with the requirements of this specification and other related parts of the Contract Documents.
- 1.3.2 Any errors or omissions noted by the PACKAGER in this Specification shall be immediately brought to the attention of the COMPANY.

1.4 **Deviations**

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

1.5 **Conflicting Requirements**

In the event of any conflict, inconsistency or ambiguity between the PACKAGER's scope of work, this Specification, National Codes and Standards, referenced in the Project Specification or any other documents, the PACKAGER shall refer to the COMPANY whose decision shall prevail.

1.6 **Reporting Procedure**

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

1.6.2 Daily, weekly monthly and run summaries of all major aspects of the production process shall be provided as reports to the COMPANY/ CONSULTANT.

1.6.3 **Third Party Inspection**

In addition to the inspection and witnessing of tests by the inspectors during the manufacturing and shipment of the Equipment/Material, COMPANY may appoint a third party or its own inspector for witnessing of the inspection and tests to be carried out at PACKAGER's facility under this specification.

1.7 **Unit Responsibility**

The PACKAGER shall be responsible for the complete, supply, fabrication, inspection and testing of the Scraper Launcher System, including full compliance with all applicable design codes and standards listed in Section 2.0, of this document, all Project Specifications, datasheets, Annexure and with the requirements of the certifying authority, if applicable.

2.0 **APPLICABLE CODES STANDARDS AND REGULATIONS**

The Scraper Launcher System shall as a minimum, comply with, but not be limited to the latest edition of International Codes and Standards, including:

2.1 **International Codes and Standards**

American Petroleum Institute (API):

API 1104 Welding of Pipelines and Related Facilities, latest edition

API RP 520 Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries.

API RP 521 Guide for Pressure – Relieving and De-pressuring Systems

API 6D Specification for Pipeline Valves, latest edition

API RP 6F Fire Test for Valves

API RP 550 Manual on Installation of Refinery Instruments & control system

American National Standards Institute (ANSI):

B16.5 Pipe Flanges and Flanged Fittings

B31.8 Gas Transmission and Distribution Piping Systems

American Society of Mechanical Engineers (ASME):

ASME Boiler & Pressure Vessel Code, Section VIII, Div 1

Steel Structures Painting Council:

Painting Manual Volume 1, “Good Painting Practices”

Painting Manual Volume 2. “Systems and Specifications”

ANSI/ISA:

S5.1, Instrumentation Symbols and Identification

American Institute of Steel Construction:

Manual of Steel Construction, “Allowable Stress Design”

Manual of Steel Construction, “Load & Resistance Factor Design”

2.2 **Project Specifications**

Specification for Piping Materials	165-2-SPM-022
Specification for Export Packing & Crating	165-2-SPM-004
Specification for Skid Mounted Packages	165-2-SPM-010
Specification for Steel Structure	165-2-SPC-025
Specification for Welding	165-2-SPM-006
Specification for Unfired Pressure Vessel	165-2-SPM-012
Specification for Painting, Lining and Surface Preparation	165-2-SPM-013
Preferred Vendor List	165-2-SPG-038
Site, Environment & Utility Data	165-2-SPG-029

2.3 **DRAWING**

Drawing for 10” x 8” NPS Fixed Scraper Launcher	165-2-MPV-001
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3.0 **SCOPE OF SUPPLY**

PACKAGER's scope for the skid mounted fixed 8" x 10" NPS scraper launcher includes provision of all materials, manufacture, fabrication, assembly, inspection, non-destructive examination, testing and painting.

PACKAGER's scope also includes supply of skid mounted scraper launcher as per schematic attached as Annexure-I and other technical requirements. Any additional requirements, not mentioned explicitly in document, but necessary for the safe and reliable operation.

The systems are to be supplied as per the specifications, pre-tested skid mounted units. The system shall be supplied fully assembled, piped to skid edge terminations.

It is intended that the unit shall be as complete as possible at PACKAGER's facilities and no assembly work shall be required at site other than connecting of inlet and outlet lines, instruments etc.

In general, the scraper launcher skid shall consist of the following as shown in Annexure-1

- Vent.
- Drain.
- Pressure Gauge
- Scraper passage indicators (Mechanical Flag and electrical switch).
- Pressure Relief System (PSV)
- Barrel suitable for scraper.
- Quick Opening Closure.
- Kicker line
- Reducer
- Drip pan beneath closure
- Loading tray for loading pigs
- Davits for loading and offloading pigs

PACKAGER shall also be responsible for:

- Procurement of all materials, including instrumentation, valves, piping, structural, etc.
- Fabrication of equipment as per approved fabrication drawings.
- Shop assembly of equipment, piping and instrumentation on the skid.

- Testing (Hydraulic, Pneumatic etc.) of equipment and piping. All Instruments shall be calibrated.
- Protective coating/painting
- Any other activity not specified above, but essential to make the package safe and operational.
- Spare Parts & Tools
 - PACKAGER shall provide a priced recommended spare parts list for 2 years of operation.
 - All spares items list shall comply with the same specifications and tests as the original equipment and shall be fully interchangeable with original parts without any modifications at site. These shall be correctly marked with reference numbers and the manufacturer's part number list.
 - A complete priced set of any recommended tools needed for the servicing of all equipment shall be provided to the approval of the COMPANY.
 - Spare parts and tools shall be part of scope of supply.

4.0 **DESIGN REQUIREMENTS**

4.1 **General**

- 4.1.1 The design life shall be 20 years minimum.
- 4.1.2 PACKAGER shall design the Scraper Launcher at design conditions indicated in drawing 165-2-MPV-001. The drawing shows the typical dimensions, design conditions, materials and minimum numbers of nozzles required. Scraper Launcher Skid will however, include complete piping and instrumentation as outlined in Annexure-I.
- 4.1.3 The Launcher assembly shall be provided with a portable, moveable dolly device for handling pigs too large for one person to manage safely
- 4.1.4 PACKAGER shall submit to COMPANY for approval, the detailed design calculations and drawings for the design of the scraper launchers/receivers including all components and appurtenances.

- 4.1.5 The Launcher assembly shall be mounted on a single structural steel skid, including two (2) saddles.
- 4.1.6 Structural components for launcher shall comply with ‘Specification for Skid Mounted Packages’ (165-2-SPM-010) and ‘Specification for Structural Steel Works’ (165-2-SPC-025).
- 4.1.7 All internal welds shall be ground flush.
- 4.1.8 Shell penetrations shall be flush with the inside of the Launcher, and have a 1/8 inch radius ground on the nozzle internal diameter.
- 4.1.9 Nozzle sizes and flange ratings shall be as defined in the Technical Requirements.
- 4.1.10 The general data for Scraper Launcher is as follows: PACKAGER shall design adequate supports to skid mount the barrels and associated piping.

NPS	TYPE	QTY.
8" x 10" NPS	Fixed Launcher	1 No.

- 4.1.11 The PACKAGER shall be responsible for the supply of flowline pigs conforming to 2C-IBR TDW Cleaning Pig or Manufacturer having equivalent specifications.

PIG SIZE	NPS (thickness)	QTY.
8"	0.281"	2 Nos.

4.2 **Environmental Data**

Environmental conditions for the equipment covered by this specification shall be in accordance with Specification ‘Site, Environment & Utility Data’ (165-2-SPG-029).

4.3 **Equipment Packaging**

Packaged equipment should be designed to minimize site hook up.

Skid contents and layout should consider the weight and dimensional limitations stated in the Specification for Skid Mounted Packages (165-2-SPM-010).

Skid dimensions are to be of sufficient size to accommodate the equipment and piping mounted on the structural steel base, no items are to protrude beyond the edge of the structural steel base. The skid layout shall provide adequate access for routine operating and maintenance.

4.4 **Mechanical Design**

The Scraper Launcher, subject of this specification are designated by their nominal diameter expressed in inches.

It shall consist of four parts, as follows:

- End closure: A quick opening closure welded to the major barrel allowing the insertion and removal of pigs.
- Major barrel: An enlarged section of the barrel used for loading or retrieving pigs.
- Reducer: A reducer between major and minor barrel.
- Minor barrel: A section of the barrel between the pig launcher/receiver valve and the reducer.

4.4.1 **End Closure**

PACKAGER shall design the launcher end closure in accordance with ASME Pressure Vessel Code, Section VIII, Division I

The end closure shall be of the intrinsically safe, horizontal, full opening, double bolt, and hinged type. Closure hinges shall be furnished with grease fitting(s).

Scrapers will be delivered fitted with a quick opening closure device provided with a locking and safety system precluding all opening of the door in case of a residual pressure remaining in the launcher.

The door shall be hand operated. Its operation shall have to be easy, simple and shall not require excessive effort.

End closures shall be of the welded end type. The ring joint shall be made of “Neoprene” or in any other synthetic material resistant to hydrocarbons.

Closures shall be of a well-trying type and shall be performed by manufacturers specialized in this kind of production.

Screwed type closures are strictly forbidden. PACKAGER shall specify ANSI 600 rated quick opening Closures TDW or equivalent for the pipeline launcher.

4.4.2 Barrels

PACKAGER shall meet ANSI B31.8 requirements for wall thickness.

PACKAGER shall design the barrels with sufficient length to accommodate the greatest length in the market of all types of scraper (foam, scraper, brush, gage plate, caliper, etc.) without the need for installing barrel extensions.

The Nominal Diameter of the major barrel shall be at least one pipe diameter larger than its associated line pipe (for NPS $\leq 10''$) and two pipe diameters greater than its associated line pipe (for NPS $\geq 12''$) both launching and for receiving traps, so that a scraper can easily be inserted or withdrawn.

The reducer between the major and minor barrel should be eccentric for horizontal traps (with the bottom of the entire barrel at the same level).

The horizontal launcher barrel shall have a downward slope of 3 to 5 degrees from the closure end. The horizontal receiver barrel shall have a downward slope of 3 to 5 degrees from the receiving end. For bi-directional launcher the barrel should be level.

4.4.3 Valves

All valves on the launchers and receivers shall meet the requirements of API 6D and API RP 6F and 'Piping Material Specification' (165-2-SPM-022).

Valves shall have open/close limit switches for connection to control panel and/or future SCADA system.

4.4.4 Supports

As the scraper traps shall be installed on metallic cradles fixed in anchoring blocks, steel wear plates of minimum 8mm thickness shall be welded on the body and on the sleeve.

4.4.5 Drip Pan

The skid shall incorporate separate drip pans underneath the closure and underneath the skid as integral parts of the skid. The drip pans shall include a slope of 1 inch in 10 feet. The drip pan shall terminate in a 2 inch, 150 pound, and flanged drain connection. The drip pan and skid shall extend beyond the pig trap closure a minimum of 6 inches. The drip pan drain shall be positioned at the low point of the drip pan.

4.4.6 Piping

The Piping on the Skid shall conform to the 'Piping Material Specification' 165-2-SPM-022.

Piping of Skid Mounted Scraper Launcher shall have following as minimum:

- Barred Tee: A tee-piece provided with bars across the internal bore of the side branch to prevent entry of a pig.
- Bypass Line: Piping between the pipeline and associated plant or facility through which fluid flows under normal operational conditions.
- Balance Line: A small-bore line which allows pressurization of the barrel on both sides of a pig at the same time.
- Kicker Line: Piping from the major barrel to the bypass line used to control the launch or receipt of a pig.
- Drain Line: A small-bore line used to drain fluid from the barrel.
- Pressurizing Line: A small-bore line with valves to allow equalization of pressure across a larger valve, avoiding damage to the seats of the larger valve.

4.4.7 Scraper Signaler

All Launcher shall be provided with suitable scraper signalers. Pig signaler shall provide local mechanical flag type indication as well as electric position switch.

4.4.8 Lifting Device

PACKAGER shall supply a suitable lifting device which shall have a lifting capacity to safely handle all scrapers associated with pipeline operations, including the heaviest scraper tool in the market.

4.4.9 Pressure Safety Valve

PACKAGER to provide safety relief valves for scraper launcher safety relief. Safety relief valve to be sized to cater to various contingencies such as:

- Blocked Outlet
- Fire etc.

4.5 Skid Instrumentation

All instruments shown on Annexure-I (within skid battery limit) and outlined in this specification shall be supplied by PACKAGER as pre-installed assemblies complete with all mounting and installation accessories.

Where it is not possible to supply any instrument as pre-installed, same shall be supplied as loose item but with complete installation / mounting accessories and installation drawings / details.

The instrumentation requirements mentioned above represent only the minimum requirements. Packager shall be responsible to verify the same and shall include any other instruments required for safe and reliable operation of the system.

All pressure gauges shall be provided with block and bleed instrument valve manifold.

All instrument installed in hazardous area shall be certified from "ATEX/FM/ BASEEFA/ CENELEC/ IEC/ UL" with equipment code 'Ex d' & provided with calibration certificate.

All instruments shall have M20 brass cable gland for armoured cable.

Relief valves shall be provided in accordance with API RP 520. Relief valves shall be set to operate at no more than the maximum stated design pressure.

4.6 **Equipment Availability / Reliability**

The facilities are to be designed for remote, unattended operation.

Significant emphasis will be placed on equipment demonstrating high levels of reliability.

Full details of the required maintenance intervals, activity durations (including site personnel requirements) and associated parts costs shall be provided for the full 20 year field life cycle.

4.7 **Operating and Maintenance Philosophy**

Full details of the operating design life of all major components, which will be subject to planned maintenance / replacement during the life of the system, shall be provided by the PACKAGER.

All system components, which require regular monitoring, or maintenance shall be easily accessible by operations personnel. The system shall be designed such that all maintenance can be carried out with the minimum of special facilities.

The PACKAGER shall include details of spares requirements for commissioning and those recommended two years operation.

5.0 **DRAWINGS, CALCULATIONS AND DOCUMENTATION**

- a) Documents, calculation sheets, drawings, etc., to be submitted to the COMPANY shall be in English Language.
- b) Unless otherwise specified, the US customary units shall be used in documents and drawings, except that pipe sizes, flange sizes and bolts/nuts shall be indicated in inches.
- c) The form of fabrication drawings and documents may be as per the PACKAGER's Standards. However, the format of the data sheet will be submitted to COMPANY for approval.

- d) Fabrication drawings and documents shall be submitted for the approval of the COMPANY. But, such approval of the COMPANY shall in no way relieve the PACKAGER of his obligations with respect to such drawings and documents.
- e) Variations from or additions to this specification shall be called to the attention of the COMPANY and approved in writing by the COMPANY prior to starting fabrication.
- f) Welding procedure specification and welding qualification record shall be submitted to the COMPANY prior to the start of fabrication.
- g) Information for installation, operating, maintenance or inspection purposes shall be submitted to COMPANY.
- h) PACKAGER shall provide all design drawings, calculations and other design documents for COMPANY's approval prior to start of fabrication.
- i) In addition, PACKAGER shall provide a comprehensive Operations & Maintenance Manual to cover the entire supplied Package.

The PACKAGER's deliverables shall include but not limited to the following details:

- Unit layout
- Load data (vertical & horizontal) and Anchor bolt plan
- Anchor bolt sizes and location
- Scraper Launcher System, piping and auxiliaries
- Skid structural design
- Itemized weights, including maintenance weights
- Piping layouts and details of the complete system
- Isometrics of the complete system
- Step-wise start-up, purging, and shutdown procedures
- Pre-start-up checklists
- Maintenance schedules
- General arrangement drawings

- Cable layout plan on Skid.
- JB Termination Drawings.
- ISA data sheets for PACKAGER supplied instruments
- List of all components with OEM brochures / catalogs / datasheets for all supplied instrumentation and cabling system components.
- List of recommended start-up, two years operation and overhaul spares for Scraper Launcher

PACKAGER connection drawings complete with detailed nozzle schedule.

PACKAGER shall make detailed calculations and shall prepare detailed shop drawings. Shop details shall be complete with dimensions.

PACKAGER shall concurrently submit to the COMPANY, fabrication drawings and detailed calculations for approval in accordance with the requisition.

Review of drawings, calculation and other documents by the COMPANY does not relieve the PACKAGER of his responsibility for the suitability of the design to suit the stated conditions.

6.0 **INSPECTION AND TESTING**

6.1 **General**

Inspection and testing shall be carried out at the PACKAGER's works and shall be witnessed by the COMPANY's/CONSULTANT authorized and/or certifying authority, if required.

The responsibility for inspection rests with the PACKAGER. However, the COMPANY/CONSULTANT and their authorized representative reserve the right to inspect the equipment at any time during fabrication to ensure that materials and workmanship are in accordance with this specification, Project Specifications, the equipment data sheets and drawings.

The PACKAGER shall provide a projected shop schedule with appropriate fabrication stages at the time drawings are submitted for approval, to highlight the inspection activity schedule.

The approval of any work by the COMPANY/CONSULTANT, or their authorized representative, shall in no way relieve the PACKAGER of any responsibility for carrying out the provisions of this specification.

6.2 **Testing**

Mechanical and performance testing shall comply with the requirements of the PACKAGER's standard test programme and the applicable data sheets. The following tests shall be performed as a minimum:

- A dimensional check
- A 100% radiographic examination
- Maneuverability of quick opening valves
- Mechanical operability of door safety system, scraper detector (receiving traps)
- performance test including a functional test of all controls and alarm and trips
- disassembly inspection at the inspector's discretion
- an equipment noise measurement

6.3 **Hydrostatic Testing**

Hydrostatic tests shall be carried out in the presence of the appointed inspector and a representative of the certifying authority, when applicable.

The resistance test shall take place in presence of the COMPANY's representative and under the direction of an expert appointed by test responsible department or the organism previously approved by the company who shall affix his stamp to apparatus which will be successfully tested.

The body of the vessel shall pass the hydro-test successfully at 1.5 times the design pressure. Hydro-test shall be performed on all the package piping after installation to check all screwed joints and compression fittings.

The outer wall of the body of the apparatus will be bare during the test. The scraper launcher/receivers will be tested to the specified test pressure for a minimum of 8 hours in accordance with applicable codes.

If a defect is detected, the manufacture will determine its gravity by grinding or chiseling. By agreement with the COMPANY, the defect may be repaired or the part rejected as the case may be.

Fresh water only shall be used for testing. When testing items manufactured from stainless steel, the chloride ion content of the test water shall not exceed 30ppm.

During testing the temperature of the vessel and test water shall not be lower than 7°C or more than 25°C.

6.4 **Tests on operation of Closing Devices of the Launcher**

The aim of these will be to check in the factory, that each locking device of Launcher works properly.

The door shall be opened and closed several times to check:

- Ease of manual operation.
- Effectiveness of the locking and safety device.

6.5 **Reports and Acceptance Certificates**

Preliminary and final dossiers shall be prepared as described in the requisition document. Other relevant certificates shall also be provided together with equipment release note.

7.0 **MARKING**

Every item of equipment shall bear a stainless steel identification plate with cast or stamped letters indicating the following:

- Name of the Contractor or Trade Name
- Type
- Serial Number
- Class of Pressure
- Test Pressure
- Date of the Test
- Maximum Service Pressure
- Stamp of the test responsible department or official organization previously approved by the COMPANY
- Stamp of the COMPANY
- Nominal Diameter of the Body
- Indication concerning the material for the trap.

8.0 **PREPARATION FOR SHIPMENT**

After the final test, the unit shall be dried and cleaned thoroughly of all grease, loose scale, and rust (both internally and externally). The preparation for shipment of the package shall meet the requirement as detail in Specification for Skid Mounted Packages (165-2-SPM-010), Specification for export Crating and Packaging (165-2-SPM-004).

PACKAGER shall also consider the following additional requirements.

8.1 **Painting**

The entire vessel (including the inside of the skirt, outside of the bottom head, entire base ring, and all skirt attachments) shall be primed and/or painted in accordance with requirements specified in 'Specification for Painting' (165-2-SPM-010). Nozzles shall be painted on the flange edges, inside bolt holes, and up to the gasket surface.

8.2 **Packaging and Crating**

- a. Suitable supports shall be provided for all internal parts, which may become damaged during shipment. If removal of the supports is required prior to putting the vessel into service, the COMPANY shall be notified in writing with a drawing showing the supports to be removed.
- b. After fabrication, ladders, platforms, and other removable items shall be completely installed on the vessel in the shop to ensure proper fit-up, then disassembled and shipped separately.
- c. The PACKAGER shall provide the vessel with wood skids or crates to ensure protection against damage during shipment.

8.3 **Shipping**

- a. Each removable piece of equipment that will be shipped separately from the vessel shall be identified with a stainless steel tag. The tag shall be securely wired to the equipment with stainless steel wire. The identification tag shall be metal die stamped with the item number, platform number, piece number, and the total number of pieces. The identification tag shall include the vessel tag number to which each piece corresponds.

- b. The COMPANY shall be notified in writing of any of the following abnormal handling procedures:
- Limitations on angle of lift
 - Restrictions for laying a vertical vessel down due to internals
 - Internal supports to be removed

9.0 **SITE ACCEPTANCE TEST (SAT) AND COMMISSIONING ASSISTANCE**

The PACKAGER shall be responsible to undertake a SAT prior to the commissioning and pre-commissioning activities. It is also envisaged that PACKAGER's expert(s) will be required to assist during pre-commissioning and commissioning of the equipment at the time of plant start up. PACKAGER's expert(s) will be also required to train (Classroom and field training) COMPANY's operations and maintenance personnel. All costs associated to the logistics required to perform these activities shall be included in the bid price.

10.0 **GUARANTEE & WARRANTY**

The warranty shall be for a period of 12 months from date of initial commissioning or for a period of not less than 18 months from the date of shipment/dispatch, whichever is earlier. The PACKAGER will warrant the equipment to be free of defects in material and workmanship, and that it is of adequate size and capability to fulfill the design and operating conditions specified herein. The PACKAGER shall replace and install, without cost to the COMPANY, any materials, supplies, or equipment, which fails under design conditions due to defects in material or workmanship. If the defect is observed and/or such failure occurs within warranty. Acceptance of this order will signify acceptance of all conditions of this warranty.

The PACKAGER shall guarantee that the system provided meets the requirements of the functional performance of this specification, other project specifications, data sheets and Annexure-1

All equipment shall be guaranteed as follows:

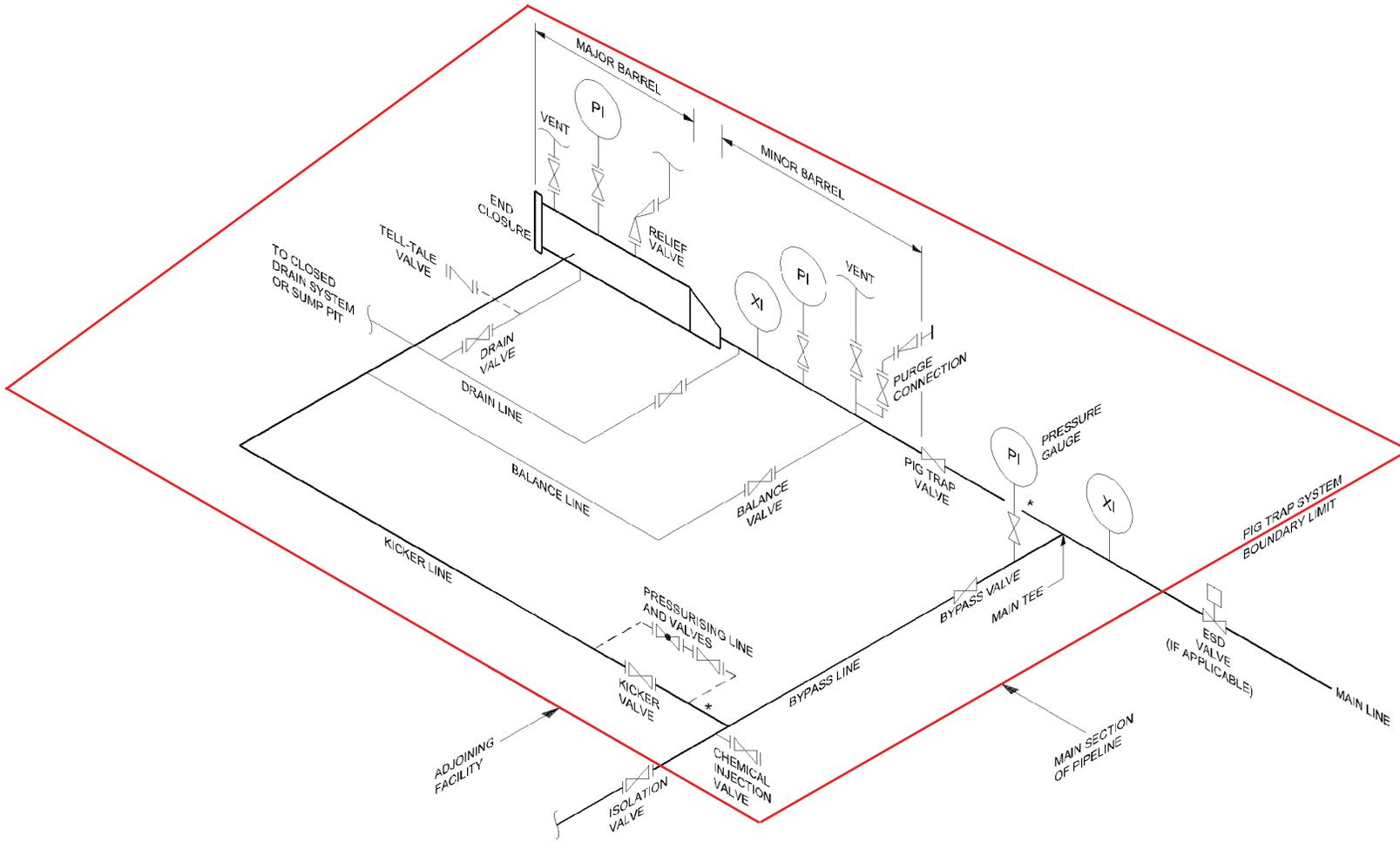
- All equipment shall perform satisfactorily under the specific operating conditions as detailed on the data sheet and shall be fit for the intended purpose.
- Tests shall confirm the PACKAGER's guaranteed performance.

The PACKAGER shall guarantee the mechanical and structural integrity, workmanship and the materials of construction used in accordance with the requisition and requirements of this specification.

ANNEXURE-I

TYPICAL PIG LAUNCHER SKID SCHEMATIC

Figure 1 Schematic of typical horizontal pig trap system



ATTACHMENT – III

AVAILABLE IN SOFT COPIES