


BASIC BID WORK

PIPELINE REPLACEMENT PROJECT –X PROJECT (PRP-X)

OIL AND NATURAL GAS CORPORATION LIMITED

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2.0 BASIC BID WORK- GENERAL DESCRIPTION

This section of bid package defines in general terms, the major components of the facilities which will form among other things the Contractor's scope of work. The basic scope of work is related to laying/replacement of submarine pipelines and topside modification works on various platforms under this contract. It shall be the responsibility of the Contractor to survey, design, engineer, procure (except free issue material i.e., bare (rigid) line pipes for subsea pipeline and risers), fabricate, load out, transport all items required (viz. pipes, fittings, specialty items, instruments, cables, tubing, cable trays, instruments & pipe supports, structural steel, clamps, pipeline materials etc.), coat & wrap, install, hook-up, flushing & cleaning of the pipelines, hydro test, hook up with topside modification and make pipelines ready for commissioning and commissioning assistance. The Contractor's responsibility shall also include dismantling, removal and disposal of old risers, riser clamps, topside piping, equipment etc. All activities necessary to carry out the required works shall be undertaken in timely & safe manner.

The facilities with major components as described herein along with all the materials & equipment required to perform the functions described shall be designed, engineered, procured, supplied, fabricated, transported, installed, hooked up, tested & pre- commissioned by the Contractor as specified in tender unless otherwise stated. All equipment / items, Spreads, vessels, materials, consumables and labour necessary to provide & complete the works shall be the responsibility of the Contractor.

The following sub-sections give a general description of the major components of the facilities envisaged under this project.

- Section 2.1 of this document covers the survey requirements for sub-marine pipelines and for risers and topside modifications on existing platforms.
- Section 2.2 of this document covers the functional description of pipelines, risers and modifications on existing well and process platforms/ complexes as applicable and miscellaneous facilities as envisaged under scope of work.
- Section 2.3 of this document covers the details of modification works envisaged on existing well and process platforms/ complexes. These platforms shall further be specified as 'existing well/ process platforms'.
- Section 2.4 of this document covers the Contractors scope of Supply under work.
- Section 2.5 of this document covers the Quality Assurance.
- Section 2.6 of this document covers the requirement related with HSE compliance.

2.1 SURVEY REQUIREMENTS

- 2.1.1 Contractor shall be fully responsible for carrying out all the Pre-engineering, Pre-construction and Post-construction surveys for all jobs covered in this document including those related to pipelines, risers, and topside modification jobs on the existing platforms. ONGC will provide Pipeline Route corridor survey (as a part of pre-engineering survey) report of all concerned pipeline segments to successful bidder.
- 2.1.2 Contractor's scope of surveys includes jacket face surveys for all the platforms on which the risers are to be installed and risers are to be removed, as per the scope of work. Pipeline surveys shall include the bathymetric survey, geotechnical survey along the pipeline route corridor and detailed surveys including dive surveys needed for acquiring details of the pipelines where tie-ins are to be carried out (including hot tapping) as per the scope of work. All surveys required for enabling such tie-ins are within the Contractor's scope of work.

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- 2.1.3 Any additional survey and investigation required to complete the work in all respect shall be the responsibility of the Contractor within in the lump sum contract price.

2.2 FUNCTIONAL DESCRIPTION- SUBMARINE PIPELINES & RISERS

The scope of work in this tender consists of full replacement of some of the existing pipelines from riser top to riser top and some of the existing pipelines from pig barrel to pig barrel including topside piping up to group Header for all the services (namely well fluid , gas lift, water injection and oil). Refer respective service P&IDs for scope. The scope also includes partial replacement of pipelines and their subsea tie-ins. In addition, it is planned to lay new lines, full replacement of pipelines for better management of the field. The pipelines shall be rigid only.

2.2.1 SUBMARINE PIPELINES & RISERS SCOPE

The complete scope of work is scattered in three different western offshore fields' viz. Mumbai High, Neelam & Heera and B&S Assets. Under this tender about 107.8 kms for 21 (additionally 02 nos Riser replacement segment) Pipeline segments is in the scope of work.

The scope of work is as follows:


Sl. No.	No. of segments	Length of pipeline to be laid (Kms)	WF	WI	GL	Asset wise segments (no)
Season I	21	107.8	12	06	03	MH-17 B&S-03 NH-01

- Scope includes 05 nos water injection pipeline (with risers) segment and 01 no water injection subsea tie-in segment with internal liquid epoxy coating.
- All well fluid pipelines (including risers) of MH & NH assets need to be FBE coated internally.

The sizes and services of subsea pipelines/risers to be laid/replaced shall be from 4" dia. to 16" dia. Pipelines are for Water injection, Gas lift and Well fluid services.

2.2.1.1 The brief description of sub-marine pipelines included in the scope of work is given below:

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2.2.1.1.1 Season-I

REFER: ANNEXURE TO SECTION 4A (Full Replacement Pipelines)									
Sl. No.	From	To	Existing Size, (In)	Proposed Size (In)	Estimated Length, Km	Service	Type	Requirement of New Launcher/ Receiver (Yes/No)	Requirement of New Deck Extension
1.	WIN	ND	06	06	3.1	Water Injection	Full Replacement	Yes	No. Space is available for one to one replacement
2.	WIN	ND	06	06	2.9	Water Injection	Full Replacement	Yes	No. Space is available for one to one replacement
3.	NI	N-10	06	06	4.6	Water Injection	Full Replacement	Yes	No. Space is available for one to one replacement
4.	MNW	N-9	04	06	2.0	Water Injection	Full Replacement	Yes	No. Space is available for one to one replacement
5.	IM	S-1-6	06	06	3.8	Water Injection	Full Replacement	Yes	No. Space is available for one to one replacement
6.	SB	SA	10	10	5.8	Well Fluid	Full Replacement	Yes	Yes. Required at SB end, Space available at SA end
7.	SP	BHS	10	10	4.1	Well Fluid	Full Replacement	Yes	No. Available at SP end ; Space available at BHS end after removal of old existing topside facility of SQ-BHS
8.	IG	BHS	14	12	2.2	Well Fluid	Full Replacement	Yes	No. (11mx2m) Space available at IG end; Space available at BHS end.
9.	N-12	NQP	12	12	6.2	Well Fluid	Full Replacement	Yes	Yes. Required at both N-12 and NQP end
10.	SJ	SA	12	12	9.0	Well Fluid	Full Replacement	Yes	Yes. Required at SJ end ; Space available at SA end after removal of old existing topside facility of SD-SA
11.	NQP	LB	4	6	3.7	Gas Lift	Full Replacement	Yes	No. Space available at both ends
12.	SHG	RS-7	6	6	4.9	Gas Lift	Full Replacement	Yes	No. Space available at both ends
13.	IL	SHP	14	14	9.6	Well Fluid	Full Replacement	Yes	No. Space available at both ends
14.	EE	SHP	10	10	2.5	Well Fluid	Full Replacement	Yes	Yes. Required at EE end (West Face)
15.	HE	HRG	14	14	7.2	Well Fluid	Full Replacement	No. However, pig barrel isolation	No

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								valve to be replaced at both ends.	
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REFER: ANNEXURE TO SECTION 4A (Additional/ New/ Alternate Pipeline)

Sl. No.	From	To	Proposed Size (In)	Estimated Length, Km	Service	Type	Requirement of New Launcher/ Receiver (Yes/No)	Requirement of New Deck Extension	Remarks
16.	MNP	WIN	06	7.1	Well Fluid (Gas)	New	Yes	Yes. Deck extension is required at both ends.	
17.	B-12-17	B-12-11	16	19.8	Well Fluid	New	Yes	Yes. Deck extension is required at both ends	
18.	N-14	NH	06	2.9	Gas Lift	New	Yes	Yes. Deck extension is required at NHA end	
19.	WO-16	SS Tie-in 30" ICP Heera TL	08	5.4	Well Fluid (Oil)	New	Yes.	No. Space available at WO-16 end	Thermally Insulated pipeline, Riser bottom to Subsea Tie in with Hot Tapping

REFER: ANNEXURE TO SECTION 4A (Part Replacement Pipeline)

Sl. No	From	To	Existing Size (Inch)	Estimated Length, Km	Service	Type
20.	B-172A	B-178A	12	1.0	WF	Part Replacement (From 0.0 KP to 1.0 KP from B-172A)

REFER: ANNEXURE TO SECTION 4A (New Subsea Tie-in Pipeline)

Sl. No.	From	To	Proposed Size (In)	Estimated Length, Km	Service	Type	Requirement of New Launcher/ Receiver (Yes/No)	Requirement of New Deck Extension	Remarks
21.	SS Tie-in (10" WI BCPA-2 to VSEA)	6" WI Lateral to VSEC	06	0.100	Water Injection	New	NA	NA	Provision of (10"x6"x10") Subsea Piggable Flow Tee

REFER: ANNEXURE TO SECTION 4A (Riser only Replacement)


From	To	Existing Size (Inch)	Service	Type	Remarks
N-8	NQO	12	WF	Riser Replacement	Replacement at N-8 Platform only
PPA	PB	4	GL	Riser Replacement	Replacement at PB Platform only

2.2.1.2 The scope shall include Pre-engineering, Pre-construction/ installation and post installation surveys, detailed engineering, removal and safe disposal of existing riser along with riser clamps (wherever applicable), transportation, laying of submarine pipeline, crossing and free span corrections, hook-up, testing and pre-commissioning, etc.

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- 2.2.1.3** Location of proposed risers shall be firmed up based on Pre- engineering Survey. EPCI Contractor shall make an effort to locate proposed replacement risers on the same face of Jacket. In case it is not feasible to locate the replacement riser on same face due to space constraint, bidder can suggest during engineering, alternate jacket face to locate risers. This should not constitute any change in scope. In case, riser protector or boat landing exists on the jacket face, where new riser is to be installed, removal & re-installation of riser protector, boat landing along with strengthening complying with the Structural design criteria to make it suitable for Riser protector shall be in the scope of work of the Contractor.
- 2.2.1.4** Contractor shall design the entire pipeline system in such a way that the pig ability of the pipeline system is fully ensured.
- 2.2.1.5** The respective section of above pipelines and risers for replacement and part replacement are to be laid as per the route firmed up after pre-engineering survey and detailed engineering.
- 2.2.1.6** Rigid pipeline system shall be provided as per requirements of section-4A. The detailed scope indicating pipeline segments, service and other details are covered in the subsequent sections of the Bid Document.
- 2.2.1.7** Cathodic protection system shall be provided as per Section- 3 .5 of the bid document.
- 2.2.1.8** Subsea Tie-in of Pipeline: In case of part-replacement, the subsea tie-in of new pipeline with existing pipeline shall be done through suitable Flange/ end connector arrangement/ Special Purpose Pipeline Repair Unit (SPRU). Contractor shall procure and installed the SPRU for each segment of part replacement and prepare the detailed procedure, which shall be approved by Company. SPRUs shall be installed in subsea Tie-in of each segment of part replacement. SPRU specification and vendor list is attached along with the tender.
- 2.2.1.9** Apart from replacement of subsea pipelines/riser, removal and dispose-off of redundant risers (along with two pipe lengths of pipeline with each riser) along with topside piping, equipment, valves and specialties up to manifold from various well, process platforms etc., are under the scope of contractor.
- 2.2.1.9.1** Details of risers to be removed are as follows:

Details of risers to be removed:				
Sl. No.	Pipeline Segment	Existing dia. (inch)	No. of risers to be removed	Remarks
1	WIN-ND	6 5/8	2	
2	WIN-N3	6 5/8	2	
3	NI-N10	6 5/8	2	
4	MNW-N9	4 1/2	2	
5	IM-S1-6	6 5/8	2	
6	SB-SA	10 3/4	2	
7	SP-BHS	10 3/4	2	
8	IG-BHS	14.0	2	
9	N12-NQP	12 3/4	2	
10	SJ-SA	12 3/4	2	
11	NQP-LB	4 1/2	2	
12	SHG-RS7	6 5/8	2	
13	IL-SHP	14.0	2	
14	EE-SHP	10 3/4	2	
15	N8-NQO	12 3/4	1	(12" at N8)
16	PPA-PB	4 1/2	1	(4" at PB)
17	10" WI BCPA2-VSEA-Tie in on existing 6" Tie-in to VSEC	10 3/4	1	(10" at VSEA)
Total:			31	

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2.3 DESCRIPTION OF FACILITIES MODIFICATIONS ON EXISTING WELL/PROCESS PLATFORMS

2.3.1 GENERAL

- This section of the Bid Document gives description of the basic requirement and criteria for the modifications of the various existing facilities. It shall be Contractor's responsibility to carry out survey, design, procure, supply, fabricate, transport, install, hook-up, test, pre-commission, start-up & commission including flushing and cleaning of the complete systems and whatever is necessary to take up and carry out the required modifications in shortest possible time in a safe manner. It is an essential requirement that the shutdown of the existing platforms is reduced to absolutely minimum. The Contractor shall be responsible for devising methods and developing detailed procedures to realize this objective and carry out the modifications in an orderly manner without obstructing operations and maintenance of existing facilities. All details and procedures shall be subject to Company's approval.
- The modification works require cutting, welding, fabrication of piping, structural items etc. and other hot works on the existing platforms/ facilities. The Contractor shall obtain hot work permits from the Company prior to taking up any hot work on existing well/ platforms.
- Under the scope of this contract, Contractor shall perform all necessary process simulations using HYSYS software (latest version) and design calculations and consider adequate design margins while specifying piping/ equipment/ instrumentation. Contractor's responsibility also includes carrying out hydraulics studies (intra-platform), safety studies, review of operability aspects of the facilities and incorporate findings of the same while designing the facilities. Any deviation shall require Company's approval.
- The indicative process & utility flow diagrams and indicative P&IDs are enclosed in the bid document. The basic purpose of these drawings is to provide details of various facilities envisaged wellhead platform / details of modification at various process or wellhead platform as applicable. Incomplete/ missing details/ systems, if any, shall be discussed and finalized during pre-engineering survey & detailed engineering and same shall be incorporated within firm scope of work. Also, the piping specs indicated in bid P&IDs shall be reviewed and revised wherever necessary, based upon safe operational requirements & approved Piping Material Specification (PMS). The identified process and utility tie-in locations are indicative, to be firmed up during pre-engineering survey. The utilities, though, have been described below in detail, however, their capacities are based on requirement/ consumption. Contractor shall develop detailed process & utility design basis, process & utility flow diagrams and material & energy balances for different cases indicated in these criteria and design the process and associated utility systems, accordingly. In case, simulation results show higher flow rates and varying pressure/ temperature ranges for some applications, the more conservative figures/ ranges shall be used for design within the scope of this contract. The process and associated utility systems shall be suitably designed for the above referred higher flow rates/ ranges. Accordingly Contractor shall develop detailed process & utility balance and flow diagrams.
- Contractor shall develop detailed Piping and Instrumentation Diagrams (P&IDs), Cause & Effect Diagrams, SAFE charts etc. incorporating all vendor information. P&IDs shall also include distribution P&IDs for all the utilities as applicable, including vent/flares, drains, fire water, fire suppression, dry chemical powder etc. and bridge inter-connections showing piping, instrumentation, valve etc. Contractor shall prepare data sheets and specifications for all the equipment, instruments, valve etc. Sufficient margins shall be taken on operating parameters viz. pressure/ pressure drop, temperature, flow, level etc. to take care of complete operating range.
- Contractor shall ensure that P&IDs shall include all required instrumentation for local as well as for remote monitoring and control of critical process parameters including but not limited to pressure, temp., flow, level etc. and shall confirm to safe operations. Additional instrumentation, if required, based upon safety

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study as well as operational necessity shall be provided as part of firmed scope under this project without time and cost implication.


- Contractor shall update existing as-built drawings for the intended modifications. Wherever as-built drawings of existing facilities are not available, Contractor shall develop drawings for the intended modifications inclusive of nearby identifiable facilities and update them to an as-built status.
- Contractor shall ensure that the design of platforms and modification works shall meet the relevant codes and standards requirements. A typical list of applicable codes is included in this Bid Package. This, however, cannot be taken as an exhaustive list and various codes and standards as mentioned in functional specifications as well as those applicable as per good engineering practices shall also form the basis and shall have to be followed by the Contractor in consultation with Company/ Company's engineering consultant.
- All the process, utility, safety and instrumentation systems shall meet the requirements of API-RP-14C "Recommended Practice for Analysis, Design, Installation and Testing of Basic Surface Safety Systems on Offshore Production Platforms – Latest Edition".
- Engineering shall also be done for all specified future facilities wherever indicated and appropriate location, space and hook-up provisions shall be kept. Relevant doc/ drawings shall be generated for review and approval.
- The Contractor shall be responsible for preparing a detailed procedure for execution of the Modification Works which shall be approved by the Company. The Contractor shall develop and execute the modification works by using prefabricated piping spools, to the maximum extent possible to keep the shutdown of existing well/ process platforms to absolutely minimum. The Contractor shall give at least thirty (30) days' notice in writing to the Company prior to taking up any Modification Works. The Company reserves the right to alter dates for modifications to meet their production targets and other requirements. Details of existing well/ process platforms have been provided in this bid document to the extent available. The Contractor shall collect the balance data/ information, if any, from work sites during pre-engineering and pre-construction surveys. Also, Contractor shall verify the details of existing well/ process platforms provided in this bid document during pre-engineering survey and update them for carrying out modification works, within the scope of this tender.
- Contractor shall perform leak test of existing well/ process platforms as part of pre-commissioning work. Further, Contractor shall pre-commission all hydrocarbon handling system and fire suppression system using lift gas and injection/ fire water, respectively. All necessary hook-up & pressure reduction provisions for taking hydrocarbons shall be provided by the Contractor. Further, in case, testing/ pre-commissioning requirement necessitates part inclusion of existing facilities, same shall be considered as included under testing/ commissioning scope of work. All such pre-commissioning activities shall be witnessed by the Company for their satisfactory completion.

2.3.1.1 FLUSHING AND PURGING

- Upon acceptance of the procedures proposed by the Contractor and as per mutually agreed schedule (Refer –Volume 1), the Company will shut down and de-pressurize the affected systems or a part of it, if required, on existing well/ process platforms and hand it over to the Contractor for execution of modification works.
- The Contractor shall be fully responsible for flushing, cleaning and purging of the system including supply of all skillets, gaskets, blinds, chemicals, etc. and making it gas free and whatever required to take up the modification jobs from safety considerations. The Contractor shall make adequate provisions for steaming the hydrocarbon systems for making them oil / gas free.

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- The flushing, cleaning and purging operations shall be done under the supervision of the Company's Representative and procedures and subject to approval by the Company. Supply of the media /fluids required for flushing, cleaning and purging shall be the responsibility of the Contractor. The media / fluids for flushing shall be the conventional media / fluids used for hydrocarbon flushing, cleaning and purging. The flushing medium fluid to be used shall be subject to approval of the Company.
- The Contractor shall develop installation techniques requiring minimum/ partial shutdown of existing well/ process platforms. As far as practicable, the modifications shall be done using the existing flanged connections / spool pieces, if any, spared by the Company, to minimize cutting and welding on the platforms. In case a spool piece is modified for providing hook-up connection, an additional similar size connection along with valve and blind flange shall also be provided. All bolting material and gaskets removed by the Contractor for carrying out modifications and /or hydrostatic testing shall be replaced with new materials supplied by the Contractor as part of his firm scope of work.
- Contractor shall be fully responsible during the entire duration of the execution of the modification for any damage caused to the existing facilities. In case any damage is taken place during the modifications work, the Contractor shall repair or replace the same with new equipment/facilities at no cost to the Company. All such works shall be carried out immediately.
- Any item, which is removed for modification works and not re-used, shall be handed over by the Contractor to the Company on designated supply vessels at offshore as per Company's instructions. All items requiring re-use shall be re-installed by the Contractor as his firm scope of work.
- The scope of work for modification on existing well/ process platforms include all modifications and additions for integration of existing facilities through inter- connection bridge if applicable, with new facilities, for ensuring intended production, handling and transportation objectives. Any inter-connection(s) not shown in modification P&IDs but identified during pre-engineering survey and required for integration to achieve intent of scope of work shall be provided by the Contractor as part of scope of work.
- The Contractor's scope of work shall include all necessary integration, modification, addition to existing piping, instrumentation and control system, safety and shutdown system etc. The broad scope of work involved is given in the Bidding Documents. However, documents/ drawings for the said modifications are indicative only and it shall be Contractor's responsibility to identify the space, routing etc. and get familiar with the existing details and type of work to be carried out on the existing well/ process platforms. The exact details shall be determined during pre-engineering survey and incorporated in detailed engineering documents/ drawings based upon approved pre-engineering survey report (topside modifications).
- Since the existing well/ process platforms are operational, the Contractor shall endeavour to plan and execute his work in such a manner that hot work and existing well/ process platforms' shut down requirement are kept to the minimum. In any case, the Contractor shall give sufficient notice and obtain prior permission from the Company for hot work or shut down of the existing well/ process platforms. Hot work permits or shutdown may be refused by the Company, if in its opinion the work can be carried out without such needs. The company also reserves its right to make some adjustments in the working time / dates for such hot works / platform shutdown in order to meet its own exigencies.
- Contractor to use the existing spare tapping if available, for connecting the new facilities or create new tapping if adequate numbers are not available. However, on all platforms, one spare tapping should be left for future hook-ups and if spare tapping is not there then contractor has to create tapping with flange.

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2.3.1.2 SAFETY STUDY

Contractor shall engage an internationally reputed third party agency having expertise in carrying out CHAZOP, HAZID, HAZOP, SIL study. The workshop shall be convened at the design centre wherein observations/ recommendations shall be deliberated in presence of / with Company's representatives/ Engineering Consultant/ Vendor the firmed-up recommendations shall be incorporated in relevant documents/drawings and after their approval, P&IDs shall be issued for "Approved for Construction (AFC).

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2.3.2 PROCESS

The description of submarine pipelines and associated modifications envisaged on existing well/ process platforms is given below –

2.3.2.1 GENERAL

The top side modification works shall include but not limited to the following:

- Dismantling and removal of existing Launchers/Receivers along with associated piping, valves, and instrumentation, structural as indicated in the bid documents.
- Installation of Launchers/Receivers and connected deck piping/ fittings along with associated piping supports, instrumentation, valves, pipe fittings, control, safety and shut down systems including interconnecting tubing/cabling/wiring, trays, tray supports and hook-up with existing facilities/equipment as indicated in the bid documents.
- Deck extension requirement if arises and identified during pre-engineering survey, the same shall be considered as part of scope of work including the requisite engineering. The following shall be complied.
 - Extension of fusible plug loops and F&G detection system and their integration with existing systems.
 - Extension of sprinkler network.
 - Extension of existing vent Header, LP/HP flare Header, and open deck drain Header (ODD), open hydrocarbon Header (ODH) and closed drain Header (CDH) and their integration with existing facilities.
 - Extension of structural supports and railings.
 - Any other related modification.


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2.3.2.2 TOPSIDE MODIFICATION WORKS ASSOCIATED WITH NEW PIPELINES/ FULL REPLACEMENT OF EXISTING PIPELINES

Table - 1

The broad details of modification work associated with replacement of pipelines/ new pipelines is given below:

Sl. No.	Pipeline Segment	Nom. Dia. in Inches	Approx. length, km. (I)	Service	Asset	Full/Part Replacement	Topside Modification
1	MNP-WIN	6	7.100	WF (Gas)	MH	New Pipeline	Refer Section 2.3.2.3
2	B12-17 - B12-11	16	19.798	WF	B&S	New Pipeline	Refer Section 2.3.2.3
3	N14-NH	6	2.910	GL	MH	New Pipeline	Refer Section 2.3.2.3
4	WO16-(ICP-HRG) Tie-in	8	5.400	WF (Oil)	MH	New Pipeline	Refer Section 2.3.2.3
5	WIN-ND	6	3.100	WI	MH	Full Replacement	Refer Section 2.3.2.3
6	WIN-N3	6	2.900	WI	MH	Full Replacement	Refer Section 2.3.2.3
7	NI-N10	6	4.60	WI	MH	Full Replacement	Refer Section 2.3.2.3
8	MNW-N9	6	2.00	WI	MH	Full Replacement	Refer Section 2.3.2.3
9	IM – S1-6	6	3.800	WI	MH	Full Replacement	Refer Section 2.3.2.3
10	SB - SA	10	5.772	WF	MH	Full Replacement	Refer Section 2.3.2.3
11	SP - BHS	10	4.060	WF	MH	Full Replacement	Refer Section 2.3.2.3
12	IG - BHS	12	2.214	WF	MH	Full Replacement	Refer Section 2.3.2.3
13	N12 - NQP	12	6.143	WF	MH	Full Replacement	Refer Section 2.3.2.3
14	SJ - SA	12	8.927	WF	MH	Full Replacement	Refer Section 2.3.2.3
15	NQP - LB	6	3.698	GL	MH	Full Replacement	Refer Section 2.3.2.3
16	SHG – RS7	6	4.857	GL	MH	Full Replacement	Refer Section 2.3.2.3
17	IL - SHP	14	9.566	WF	MH	Full Replacement	Refer Section 2.3.2.3
18	EE - SHP	10	2.435	WF	MH	Full Replacement	Refer Section 2.3.2.3
19	HE - HRG	14	7.191	WF	NH	Full Replacement	Refer Section 2.3.2.3
20	B172 – B178	12	1.200	WF	B&S	Part Replacement	
21	N8 - NQO	12	0	WF	MHN	Riser Replacement	

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22	PPA - PB	4	0	GL	B&S	Riser Replacement	
23	SS Tie-in (10" BCPA-2 to VSEA)- 6"Lateral to VSEC	6	0.1	WI	B&S	Subsea Piggable Tie-In	

2.3.2.3 PLATFORM WISE TOPSIDE MODIFICATION SCOPE OF WORK

Table – 2

MH ASSET (New Pipeline)		
01	MNP-WIN Well Fluid Line	
	MNP Platform	a. Installation of new 6" X 8" WF Launcher and 6" riser along with associated piping and instruments, valves for MNP - WIN Gas pipeline. b. Hook up of new 6" X 8" WF Launcher with Production Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. c. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. d. Deck extension if required as per Piping SOW e. For details refer P&ID no.
	WIN Platform	a. Installation of new 6" X 8" WF Receiver and 6" riser along with associated piping and instruments, valves for MNP - WIN Gas pipeline. b. Hook up of new 6" X 8" WF Receiver with Production Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. c. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. d. Deck extension if required as per Piping SOW e. For details refer P&ID no.
02	N14 - NHA Gas Lift line	
	N14 Platform	a. Installation of new 6"x 8" Gas Lift Launcher at N14 and 6" riser along with associated piping and instruments, valves for Gas Lift pipeline. b. Hook up of new 6"x8" Gas Lift Launcher with Gas Lift Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. c. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. d. Installation of cone metering at Launcher end on 4" N14 - NH Gas Lift line e. Deck extension if required as per Piping SOW f. For details refer P&ID

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	NHA Platform	a. Installation of new 6”x 8” Gas Lift Receiver at NHA and 6” riser along with associated piping and instruments, valves for Gas Lift pipeline. b. Hook up of new 6”x8” Gas Lift Receiver with Gas Lift Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. c. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. d. Installation of cone metering at Receiver end on 6” N14 - NHA Gas Lift line e. Deck extension if required as per Piping SOW. f. For details refer P&ID		
03	WO16-(ICP-HRG 30” Line) Subsea Tie-in Well Fluid Line			
	WO-16 Platform	a. Installation of new 8”x10” WF Receiver along with associated piping and instruments, valves. b. Hook up of new 8”x10” WF Receiver with existing 8” riser, Well Fluid Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. c. For details refer P&ID		
B&S ASSET (New Pipeline)				
04	B12-17 – B12-11 Well Fluid Line			
	B12-17 Platform	a. Installation of new 16” X 20” WF Launcher and 16” riser along with associated piping and instruments, valves for B12-17 to B12-11 WF pipeline. b. Hook up of new 16” X 20” WF Launcher with Production Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. c. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. d. Deck extension if required as per Piping SOW e. For details refer P&ID no.		
	B12-11 Platform	a. Installation of new 16” X 20” WF Receiver and 16” riser along with associated piping and instruments, valves for B12-17 to B12-11 WF pipeline. b. Hook up of new 16” X 20” WF Receiver with Production Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. c. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. d. Deck extension if required as per Piping SOW e. For details refer P&ID no.		
MH ASSET (Full Replacement Pipeline)				
05	SB-SA Well Fluid Line			
	SB Platform	a. Removal of existing X” x Y” WF Launcher and X” riser along with associated piping and instruments, valves of SB-SA Well Fluid Line b. Installation of new 10”x12” WF Launcher and 10” riser along with associated piping and instruments, valves for SB WF pipeline. c. Hook up of new 10”x12” WF Launcher with Production Header, Open Drain Header, Closed Drain Header, Vent Header with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. Deck extension if required as per Piping SOW f. For details refer P&ID no.		
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	SA Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WF Receiver and X” riser along with associated piping and instruments, valves of SB-SA Well Fluid Line. b. Installation of new 10”x12” WF Receiver and 10” riser along with associated piping and instruments, valves for SA WF pipeline. c. Hook up of new 10”x12” WF Receiver with Production Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. For details refer P&ID no.
06	SP-BHS Well Fluid Line	
	SP Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WF Launcher and X” riser along with associated piping and instruments, valves of existing SP-BHS WF Line. b. Installation of new 10”x12” WF Launcher and 10” riser along with associated piping and instruments, valves for SP WF pipeline. c. Hook up of new 10”x12” WF Launcher with Production Header, Open Drain Header, Closed Drain Header, Vent Header with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. For details refer P&ID no.
	BHS Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WF Receiver with associated piping and instruments, valves of existing SP-BHS WF Line. b. Removal of existing X” x Y” WF Receiver with associated piping and instruments, valves of SQ-BHS Line. c. Installation of new 10”x12” WF Receiver with associated piping and instruments, valves for BHS WF pipeline. d. Hook up of new 10”x12” WF Receiver with Production Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. e. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. f. For details refer P&ID no.
07	IG-BHS Well Fluid Line	
	IG Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WF Launcher and X” riser along with associated piping and instruments, valves of existing IG-BHS WF Line. b. Installation of new 12”x16” WF Launcher and 12” riser along with associated piping and instruments, valves for IG WF pipeline. c. Hook up of new 12”x16” WF Launcher with Production Header, Open Drain Header, Closed Drain Header, Vent Header with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. For details refer P&ID no.

	BHS Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WF Receiver with associated piping and instruments, valves of existing IG-BHS WF Line. b. Installation of new 12”x16” WF Receiver with associated piping and instruments, valves for BHS WF pipeline. c. Hook up of new 12”x16” WF Receiver with Production Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. For details refer P&ID no.
08	N12-NQP Well Fluid Line	
	N-12 Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WF Launcher and X” riser along with associated piping and instruments, valves of N12-NQP Well Fluid Line. b. Installation of new 12”x16” WF Launcher and 12” riser along with associated piping and instruments, valves for N12 WF pipeline. c. Hook up of new 12”x16” WF Launcher with Production Header, Open Drain Header, Closed Drain Header, Vent Header with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. Deck extension if required as per Piping SOW f. For details refer P&ID no.
	NQP Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WF Receiver with associated piping and instruments, valves of N12-NQP Well Fluid Line.. b. Installation of new 12”x16” WF Receiver with associated piping and instruments, valves for NQP WF pipeline. c. Hook up of new 12”x16” WF Receiver with Production Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. Deck extension if required as per Piping SOW f. For details refer P&ID no.
09	SJ - SA Well Fluid Line	
	SJ Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WF Launcher and X” riser along with associated piping and instruments, valves of SJ - SA Well Fluid Line. b. Installation of new 12”x16” WF Launcher and 12” riser along with associated piping and instruments, valves for SJ WF pipeline. c. Hook up of new 12”x16” WF Launcher with Production Header, Open Drain Header, Closed Drain Header, Vent Header with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. Deck extension if required as per Piping SOW f. For details refer P&ID no.

SA Platform

- Removal of existing X" x Y" WF Receiver with associated piping and instruments, valves of SJ - SA Well Fluid Line.
- Removal of existing X" x Y" WF Receiver with associated piping and instruments, valves of SD-SA Line.
- Installation of new 12"x16" WF Receiver with associated piping and instruments, valves for SA WF pipeline.
- Hook up of new 12"x16" WF Receiver with Production Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments.
- Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system.
- For details refer P&ID no.

10 IL - SHP Well Fluid Line

IL Platform

- Removal of existing X" x Y" WF Launcher and X" riser along with associated piping and instruments, valves of IL - SHP Well Fluid Line.
- Installation of new 14"x16" WF Launcher and 14" riser along with associated piping and instruments, valves for IL WF pipeline.
- Hook up of new 14"x16" WF Launcher with Production Header, Open Drain Header, Closed Drain Header, Vent Header with associated piping and instruments.
- Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system.
- For details refer P&ID no.

SHP Platform

- Removal of existing X" x Y" WF Receiver with associated piping and instruments, valves of IL - SHP Well Fluid Line..
- Installation of new 14"x16" WF Receiver with associated piping and instruments, valves for SHP WF pipeline.
- Hook up of new 14"x16" WF Receiver with Production Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments.
- Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system.
- For details refer P&ID no.


11 EE-SHP Well Fluid Line

EE Platform

- Removal of existing X" x Y" WF Launcher and X" riser along with associated piping and instruments, valves of EE-SHP Well Fluid Line.
- Installation of new 10"x12" WF Launcher and 10" riser along with associated piping and instruments, valves for EE WF pipeline.
- Hook up of new 10"x12" WF Launcher with Production Header, Open Drain Header, Closed Drain Header, Vent Header with associated piping and instruments.
- Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system.
- Deck extension if required as per Piping SOW
- For details refer P&ID no.

	SHP Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WF Receiver with associated piping and instruments, valves of EE-SHP Well Fluid Line. b. Installation of new 10”x12” WF Receiver with associated piping and instruments, valves for SHP WF pipeline. c. Hook up of new 10”x12” WF Receiver with Production Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. Deck extension if required as per Piping SOW f. For details refer P&ID no.
12	NQP - LB Gas Lift Line	
	NQP Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” Gas Lift Launcher with associated piping and instruments, valves of NQP - LB Gas Lift Line. b. Installation of new 6”x 8” Gas Lift Launcher and 6” riser at NQP along with associated piping and instruments, valves for Gas Lift pipeline. c. Hook up of new 6”x8” Gas Lift Launcher with Gas Lift Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. Installation of Orifice metering at Launcher end on 6” Gas Lift line. f. For details refer P&ID
	LB Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” Gas Lift Receiver with associated piping and instruments, valves of NQP - LB Gas Lift Line.. b. Installation of new 6”x 8” Gas Lift Receiver and 6” riser at LB along with associated piping and instruments, valves for Gas Lift pipeline. c. Hook up of new 6”x8” Gas Lift Receiver with Gas Lift Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. For details refer P&ID
13	SHG - RS7 Gas Lift Line	
	SHG Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” Gas Lift Launcher with associated piping and instruments, valves of SHG - RS7 Gas Lift Line. b. Installation of new 6”x 8” Gas Lift Launcher and 6” riser at SHG along with associated piping and instruments, valves for Gas Lift pipeline. c. Hook up of new 6”x8” Gas Lift Launcher with Gas Lift Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. Installation of Orifice metering at Launcher end on 6” Gas Lift line. f. For details refer P&ID

	RS-7 Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” Gas Lift Receiver with associated piping and instruments, valves of SHG - RS7 Gas Lift Line. b. Installation of new 6”x 8” Gas Lift Receiver and 6” riser at RS7 along with associated piping and instruments, valves for Gas Lift pipeline. c. Hook up of new 6”x8” Gas Lift Receiver with Gas Lift Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. For details refer P&ID
14	WIN–ND Water Injection Line	
	WIN Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WI Launcher and riser along with associated piping and instruments, valves of WIN–ND Water Injection Line. b. Installation of new 6”x8” WI Launcher and 6” riser along with associated piping and instruments, valves for WIN Water Injection pipeline. c. Hook up of new 6”x8” WI Launcher with Water Injection Header, Open Drain Header, Closed Drain Header, Vent Header with associated piping and instruments d. Magnetic type flow meter for Water injection measuring system along with Corrosion, Biological& scale coupon e. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. f. For details refer P&ID
	ND Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WI Receiver and riser along with associated piping and instruments, valves of WIN–ND Water Injection Line. b. Installation of new 6”x8” WI Receiver and 6” riser along with associated piping and instruments, valves for Water Injection pipeline. c. Hook up of new 6”x8” WI Receiver with Water Injection Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. Magnetic type flow meter for Water injection measuring system along with Corrosion, Biological& scale coupon f. For details refer P&ID
15	WIN–N3 Water Injection Line	
	WIN Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WI Launcher and riser along with associated piping and instruments, valves of WIN–N3 Water Injection Line. b. Installation of new 6”x8” WI Launcher and 6” riser along with associated piping and instruments, valves for WIN Water Injection pipeline. c. Hook up of new 6”x8” WI Launcher with Water Injection Header, Open Drain Header, Closed Drain Header, Vent Header with associated piping and instruments d. Magnetic type flow meter for Water injection measuring system along with Corrosion, Biological& scale coupon e. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. f. For details refer P&ID

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	N-3 Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WI Receiver and riser along with associated piping and instruments, valves of WIN–N3 Water Injection Line.. b. Installation of new 6”x8” WI Receiver and 6” riser along with associated piping and instruments, valves for Water Injection pipeline. c. Hook up of new 6”x8” WI Receiver with Water Injection Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. Magnetic type flow meter for Water injection measuring system along with Corrosion, Biological& scale coupon f. For details refer P&ID
16	NI - N10 Water Injection Line	
	NI Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WI Launcher and riser along with associated piping and instruments, valves of NI - N10 Water Injection Line. b. Installation of new 6”x8” WI Launcher and 6” riser along with associated piping and instruments, valves for NI Water Injection pipeline. c. Hook up of new 6”x8” WI Launcher with Water Injection Header, Open Drain Header, Closed Drain Header, Vent Header with associated piping and instruments d. Magnetic type flow meter for Water injection measuring system along with Corrosion, Biological& scale coupon e. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. f. For details refer P&ID
	N-10 Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WI Receiver and riser along with associated piping and instruments, valves of NI - N10 Water Injection Line. b. Installation of new 6”x8” WI Receiver and 6” riser along with associated piping and instruments, valves for Water Injection pipeline. c. Hook up of new 6”x8” WI Receiver with Water Injection Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments. d. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. e. Magnetic type flow meter for Water injection measuring system along with Corrosion, Biological& scale coupon. f. For details refer P&ID
17	MNW-N9 Water Injection Line	
	MNW Platform	<ul style="list-style-type: none"> a. Removal of existing X” x Y” WI Launcher and riser along with associated piping and instruments, valves of MNW - N9 Water Injection Line. b. Installation of new 6”x8” WI Launcher and 6” riser along with associated piping and instruments, valves for MNW Water Injection pipeline. c. Hook up of new 6”x8” WI Launcher with Water Injection Header, Open Drain Header, Closed Drain Header, Vent Header with associated piping and instruments d. Magnetic type flow meter for Water injection measuring system along with Corrosion, Biological& scale coupon e. Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system. f. For details refer P&ID

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N-9 Platform

- Removal of existing X" x Y" WI Receiver and riser along with associated piping and instruments, valves of MNW - N9 Water Injection Line.
- Installation of new 6"x8" WI Receiver and 6" riser along with associated piping and instruments, valves for Water Injection pipeline.
- Hook up of new 6"x8" WI Receiver with Water Injection Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments.
- Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system.
- Magnetic type flow meter for Water injection measuring system along with Corrosion, Biological& scale coupon
- For details refer P&ID

18 IM - S1-6 Water Injection Line

IM Platform

- Removal of existing X" x Y" WI Launcher and riser along with associated piping and instruments, valves of IM - S1-6 Water Injection Line.
- Installation of new 6"x8" WI Launcher and 6" riser along with associated piping and instruments, valves for IM Water Injection pipeline.
- Hook up of new 6"x8" WI Launcher with Water Injection Header, Open Drain Header, Closed Drain Header, Vent Header with associated piping and instruments
- Magnetic type flow meter for Water injection measuring system along with Corrosion, Biological& scale coupon
- Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system.
- For details refer P&ID

S1-6 Platform

- Removal of existing X" x Y" WI Receiver and riser along with associated piping and instruments, valves of IM - S1-6 Water Injection Line.
- Installation of new 6"x8" WI Receiver and 6" riser along with associated piping and instruments, valves for Water Injection pipeline.
- Hook up of new 6"x8" WI Receiver with Water Injection Header, Open Drain Header, Closed Drain Header, Vent Header, with associated piping and instruments.
- Associated modification and hook-up related to safety, piping, instrumentation, electrical, control & communication system.
- Magnetic type flow meter for Water injection measuring system along with Corrosion, Biological& scale coupon
- For details refer P&ID.

NH Asset (Full Replacement Pipeline)

19 HE- HRG Well Fluid Pipeline

HE Platform

- Removal of existing Pig Barrel Isolation Valve of HE- HRG Well Fluid Pipeline.
- Installation of new 14" Pig Barrel Isolation Valve of HE- HRG Well Fluid Pipeline.

HRG Platform

- Removal of existing Pig Barrel Isolation Valve of HE- HRG Well Fluid Pipeline.
- Installation of new 14" Pig Barrel Isolation Valve of HE- HRG Well Fluid Pipeline.

B&S Asset (Part Replacement Pipeline)

20	B172A-B178A Well Fluid Pipeline	
	B-172A Platform	NIL
	B-178A Platform	NIL
MH Asset (Riser only Replacement)		
21	N8-NQO Well Fluid Line	
	N-8 Platform	a. Removal of existing 12” WF riser of N8-NQO Well Fluid Line b. Installation of new 12” riser for existing 12” Well Fluid pipeline. c. Hook up of new 12” riser with associated topside piping.
	NQO	NIL
B&S Asset (Riser only Replacement)		
22	PPA-PB Gas Lift Line	
	PPA Platform	NIL
	PB Platform	a. Removal of existing 4” GL riser of PPA-PB Gas Lift Line. b. Installation of new 4” riser for existing 4” Gas Lift pipeline. c. Hook up of new 4” riser with associated topside piping.
B&S Asset (Subsea Piggable tie-in)		
23	SS Tie-in (10" BCPA-2 to VSEA)- 6" Lateral to VSEC Water injection Pipeline	
	VSEA Platform	Removal of existing 10” WI riser of old BCPA-2 -VSEA WI line
	VSEC Platform	NIL

2.3.2.4 PROCESS DESIGN BASIS

Sl. No.	Pipeline Segment	Service	Asset	Full/ Part	SHUT-IN/ Design pressure (kg/cm ²)	SHUT-IN/ Design Temperature (°C)
1	MNP-WIN	Gas	MH	New	105.0	75
2	B12-17 - B12-11	WF	B&S	New	144.0	65
3	N14-NH	GL	MH	New	105.0	75
4	WO16-(ICP-HRG) SS Tie-in	Oil	MH	New	150.0	75
5	WIN-ND	WI	MH	Full	151.6	55
6	WIN-N3	WI	MH	Full	151.6	55
7	NI-N10	WI	MH	Full	151.6	55
8	MNW-N9	WI	MH	Full	151.6	55
9	IM – S1-6	WI	MH	Full	151.6	55
10	SB - SA	WF	MH	Full	90.0	90
11	SP - BHS	WF	MH	Full	90.0	90
12	IG - BHS	WF	MH	Full	90.0	90
13	N12 - NQP	WF	MH	Full	93.7	104

14	SJ - SA	WF	MH	Full	90.0	100
15	NQP - LB	GL	MH	Full	105.0	75
16	SHG – RS7	GL	MH	Full	105.0	75
17	IL - SHP	GL	MH	Full	141.0	104
18	EE - SHP	WF	MH	Full	141.0	104
19	HE - HRG	WF	NH	Full	92.0	93
20	B172 – B178	WF	B&S	Part	122.4	55
21	N8 - NQO	WF	MHN	Riser	93.7	104
22	PPA - PB	GL	B&S	Riser	105.0	75
23	SS Tie-in (10" BCPA-2 to VSEA)- 6"Lateral to VSEC	WI	B&S	SS Tie in	151.6	55

2.3.2.5 PROCESS OPERATING DATA

Season 1									
S. No.	Pipeline Name	Service	Departing Pr. (kg/cm ² g)		Departing Temp. (°C)		Arrival Pr. (kg/cm ² g)		Arrival Temp. (°C)
1		Well Fluid							
2		Well Fluid							
3		Well Fluid							
4		Well Fluid							
5		Well Fluid							
6		Well Fluid							
7		Well Fluid							

MH Asset Well Fluid Line						
S. No.	Pipeline Name	Service	Oil Production (BOPD)	Gas production (SCMD)	Water Flow rate (BWPD)	Liquid Flow rate (BPD)
1		Well Fluid				
2		Well Fluid				
3		Well Fluid				
4		Well Fluid				

MH Asset Gas Lift Line			
S. No.	Pipeline Name	Service	Gas Injection Flow Rate (BWPD)
1		GL	
2		GL	

MH Asset Water Injection Line

S. No.	Pipeline Name	Service	WI Flow Rate (BWPD)
1		WI	
2		WI	

NH Asset Well Fluid Line

S. No.	Pipeline Name	Service	Oil Production (BOPD)	Gas production (SCMD)	Water Flow rate (BWPD)	Liquid Flow rate (BPD)
1		Well Fluid				

B&S Asset Well Fluid Line

S. No.	Pipeline Name	Service	Oil Production (BOPD)	Gas production (SCMD)	Water Flow rate (BWPD)	Liquid Flow rate (BPD)
1		Well Fluid				


B&S Asset Water Injection Line

S. No.	Pipeline Name	Service	WI Flow Rate (BWPD)
1		WI	
2		WI	

B&S Asset Gas Lift Line

S. No.	Pipeline Name	Service	Gas Injection Flow Rate (BWPD)
1		GL	
2		GL	

Note: Margin of 10% shall be considered for the maximum flow rate and turndown ratio of 10% shall be considered for minimum flow rate where only normal flow rate/s are provided.

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2.3.3 PIPING


2.3.3.1 GENERAL

- I. The piping scope of work envisaged under this tender broadly consists of but not limited to design, supply, fabrication, installation, testing, pre-commissioning and commissioning & other assistance of piping systems, instruments etc. of platforms, Hook-up, modification works at existing platforms as per the Description of Work (Basic Bid Work) and approved P & IDs including interface jobs as indicated elsewhere in the bidding documents.
- II. The materials, design and workmanship shall conform to relevant codes, piping design criteria & functional specifications contained in the bid package.
- III. Contractor shall make detailed specification and datasheets (including PMS & VMS) for piping and piping specialty items as per process requirements and submit the same for review & approval during detailed engineering.
- IV. Corrosion coupons and retrieval tool kit shall be provided as per process requirement and specification attached elsewhere in the bid package.
- V. Contractor shall be responsible for complete execution of the project as per design criteria, functional specifications, Description of Work (Basic Bid Work), approved/reviewed DCI & MCI documents and approved P&IDs.
- VI. Supply, design, fabrication and installation of pipe supports are in contractor's scope. Contractor shall develop piping support standards and submit the same for review and approval.
- VII. It is to be noted that drawings of existing platforms to extent available have already been included in the bid document. Any further details/information required for detail engineering shall be collected by bidder during pre-engineering survey from the respective platform for modification jobs.
- VIII. Any other work not specifically mentioned above but required for completeness of work as per specification/ drawings shall be in contractor's scope.

2.3.3.2 MODIFICATION WORKS ON EXISTING PLATFORMS- PIPING


- I. The entire scope of piping work related to modification works at existing platforms shall be as per the Description of Work (Basic Bid Work) – Process and approved P & IDs.
- II. The material, design and workmanship shall conform to relevant codes and standards, piping design criteria & functional specifications contained in the bid package.
- III. Equipment layout drawings for existing well/process platforms where new equipment/vessels/facilities are being installed shall be prepared by contractor based on pre-engineering survey. During pre-engineering survey, in case any unforeseen or unidentified structure/ piping/ equipment etc. found to exist at the platform for which installation of new equipment is hindrance, Contractor shall readjust/ relocate the equipment/ piping as part of scope of work under this tender and submit the modified drawing for Company's approval.
- IV. The contractor shall develop Equipment Layouts, Safety Equipment Layouts, Piping General Arrangement drawings, Isometrics & Piping support drawings etc. in accordance with piping design criteria, functional specifications, codes and standards, Description of Work (Basic Bid Work), approved P & IDs, recommendations of Safety Studies, Material Handling Studies etc. during project stage and submit the same for review/approval/information.

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- V. It is contractor's responsibility to ascertain exact pipe routing/pipe sizes/rating/MOC/relocation of Equipment/Requirement of deck extension etc. for meeting the requirement of Basic Bid Work and approved P&IDs. Contractor shall conduct necessary site surveys to collect as built data/drawings not enclosed in the bid package and ensure that piping/ equipment clears all existing structures, cable trays, instrument racks, nearby supporting structure or any other equipment. Wherever as built drawings are not available, Contractor shall carry out detailed site survey, gather information from existing well platforms, develop the drawings and submit these for Company's review/ approval.
- VI. Contractor shall prepare detailed survey report for complete scope of work including hook-up details and submit the same for approval. Wherever riser replacement/ new riser is envisaged in scope, Hook-up of risers with existing topside piping is in contractor's firm scope of work.
- VII. Routing of new lines shall be same as the old one being replaced to the extent possible.
- VIII. Contractor shall provide/extend all safety equipment and systems, as required in the areas where new facilities are provided.
- IX. Contractor shall provide deck drains on the extended portions of the platforms and hook it up with existing deck drains.
- X. Contractor shall provide necessary material handling provisions for the new facilities.
- XI. Contractor's scope of work shall include modification/ integration as per approved P&IDs and other requirements listed in elsewhere in the Bid Documents. Contractor may be required to open/dismantle/realign/modify any facility or instrument or piping or equipment of the existing facilities. It will be the contractor's responsibility to make good, test and re-commission all such facilities during and after completion of works with minimum period of platform shutdown. Details of total shutdown required for each modification/integration shall be submitted to company for approval.
- XII. Contractor shall perform the necessary modification/ integration work on the basis of actual physical conditions/ data/ parameters found during the site survey. Contractor shall not be entitled to any cost and time compensation on this account. In case the space available is not adequate for new facilities, the contractor shall propose the deck extension as required & the same shall be in the firm scope of the contractor.
- XIII. Contractor shall also do the necessary patch up insulation work where insulation is opened up during tapping/ tie-in/ hook-up. Contractor shall plan & carry out suitable positive isolation, depressurization, cleaning, purging, flushing, hydro-testing, drying, and painting & removal of temporary supports, scaffolding etc. Contractor shall take all precautions & follow safety procedures to execute the job safely without any operational hazard.
- XIV. Contractor shall ensure, before submission of bid offer, that the space allocated for the various facilities for the modification is adequate and satisfactory. In case, any additional space/ facility such as provision of any walkway/operating platform for maintenance and operation of valve etc. are warranted, the contractor shall indicate the same in bid offer and the cost shall be included in the lump sum price.
- XV. In case any existing facility is to be relocated or existing piping is to be altered in order to carryout platform's modifications, Contractor shall execute these changes including testing etc. without any major shut down.
- XVI. Contractor shall modify the support design wherever necessary to finalize the new support without any intervention with the existing facilities. Installation of pipe work, pipe supports, instruments etc. shall be such that existing walkways / escape routes / maintenance access to existing facilities are not encroached.
- XVII. In case where emergency shutdown valves (ESDV) are to be installed on the risers just above the jacket level platform, then necessary maintenance and operational platform shall be provided for the actuator. Necessary Mechanical Guard/Protector shall be provided to prevent regress of splash water in to valve, actuator and instrument. Necessary material handling arrangements shall also be provided for loading/unloading of valve/actuator at jacket level.

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- XVIII. If the bid document / P & IDs specially require any existing facility to be altered or reused, the same shall be done by the Contractor after verifying/ checking the condition of existing facility. If any part of hook-up location as per approved P&ID is found to be defective/repairable, contractor shall replace/ repair the same without any extra time and cost.
- XIX. Contactor shall show the existing piping & Equipment on both sides of the new piping in GAD for modification works to ensure easy location of the piping.
- XX. Contractor shall be responsible to complete the scope of work with minimum shut down. To achieve the objective, contractor shall make arrangement like temporary connection/modification in safe manner so that shut down is reduced to minimum. Arrangement/ Procedure for the same shall be finalized during pre-engineering survey and submit the same for company's approval. Company shall have right to change the proposal made by contractor based on production and availability of the platform.
- XXI. Contractor to ensure below cellar deck piping routing shall be kept within the platform deck boundary and at the highest elevation to the extent possible.
- XXII. Contractor shall bring out all the possible piping routing option in the pre engineering survey report.
- XXIII. Contractor shall collect all the necessary data regarding current ongoing projects from ONGC for intended modification site prior to carrying out the actual pre engineering survey. This is to avoid interfacing issues prior to modification jobs executions.
- XXIV. Contractor to note wherever ONGC provide 3D model of existing platforms on as is basis, contractor shall be updating the same with their modification scope of works.
- XXV. Contractor to ensure that any modifications for completion of scope of work shall in no way interfere with operating philosophy of the existing platform unless approved otherwise by company.
- XXVI. Contractor shall prepare 3D model for topside modification scope of work. The intent of 3D model is to generate piping GAD, Equipment Layout, piping BOM (Bill of Material) for topside modification work. Contractor during pre-engineering survey shall collect all the relevant data related to modelling of its scope of work including existing nearby piping, Structure framing, broad nearby equipment dimension etc. The 3D model should include the modification scope of work and its interaction with existing facility for the purpose of review during detailed engineering.

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APPROXIMATE DECK EXTENSION/SPACE REQUIRED FOR PIPING SCOPE ONLY

Platform Name	Item To Be Installed	Space Required
MNP	6"x8" GL Launcher for MNP-WIN line	6 m x 1.5 m
WIN	6"x8" GL Receiver for MNP-WIN line	6 m x 1.5 m
B12-17	16"x 20" WF Launcher for B12-17 - B12-11 line	16m x 2.5m
B12-11	16"x 20" WF Receiver for B12-17 - B12-11 line	16m x 2.5m
N14	6"x8" GL Launcher for N14-NHA line	6 m x 1.5 m
NHA	6"x8" GL Receiver for N14-NHA line	6 m x 1.5 m
SB	10"x 12" WF Launcher for SB-SA line	10m x 2m
N12	12"x14" WF Launcher for N12-NQP line	12 m x 2 m
NQP	12"x14" WF Receiver for N12-NQP line	12 m x 2 m
SJ	12"x14" WF Launcher for SJ-SA line	12 m x 2 m
EE	10"x12" WF Launcher for EE-SHP line	10 m x 2 m

Equipment Layout to the extent available is attached. Other required details shall be collected by Successful Bidder during Pre-Engineering Survey.

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2.3.4 STRUCTURE

2.3.4.1 GENERAL

The Scope of Work defines the extent of services and responsibilities of the Contractor, while all detailed design requirements, design philosophy, loads, checks, safety provisions, and acceptance criteria shall be governed by the applicable Design Criteria and Functional Specifications issued with the Bid, compliance with which shall be deemed included in the Scope of Work.

All drawings, layouts, and data provided with the Bid are indicative and shall be used for reference only; the Contractor shall verify all dimensions, levels, member sizes, and site conditions through pre-engineering surveys and shall base the detailed engineering on actual site conditions.

The Contractor shall be responsible for assessing the adequacy of existing structures affected by the proposed pipeline replacement works and for providing all necessary modifications, strengthening, extensions, and protective measures required for safe and compliant execution of the work.

Any activity, item, or service not expressly mentioned in the Scope but required for the complete, safe, and compliant execution of the work in accordance with the Design Criteria, including coordination with other disciplines, shall be deemed to be included in the Scope of Work and shall not constitute a variation.

The Contractor's structural scope of work shall in general include the following:

Pre-engineering survey, Detailed Design & Engineering, Procurement, Fabrication, Load-out, Sea fastening, Transportation, pre-construction survey, Installation, post installation / construction survey and as built documentations. The interface activities, if any, with other Contractors for overall completion shall be deemed as included in the scope.

2.3.4.2 STRUCTURAL SCOPE

The Structural Scope of Work shall be read in combination with "Background and General", "Structural Design Criteria (sec 3.4)", Structural Functional Specifications and "Scope of Work & Design Criteria for other disciplines" of the Bid.

The Contractor shall carry out a comprehensive Pre-Engineering Survey of the existing platform and associated structures prior to detail engineering. The survey shall include verification of deck elevations, dimensions, member sizes, material condition, and thickness of all existing structural members affected by the works using appropriate methods such as ultrasonic thickness gauging, identification of physical obstructions, verification of as-built data, and confirmation of site constraints including chart datum and seabed conditions. The findings of the Pre-Engineering Survey shall form the basis for detailed engineering, design of deck extensions, modifications, strengthening works, drop object protection, and installation of I-Tubes/J-Tubes, risers, and clamps. Any discrepancies, constraints, or issues identified during the survey shall be reported along with feasible engineering solutions for Company review and approval.

Contractor to note that existing location of launcher/receiver is to be used for lines under replacement wherever possible.

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Contractor shall prepare AFC drawings in confirmation with the outcome of the pre-engineering survey. Design of deck extension and top side modification works shall be carried out as per structural design criteria Section 3.4 of Part-I & II of bid document and scope of the work mentioned elsewhere in the bid document.

All painting work shall be carried out as per latest Specification for protective coating – Spec. 2005. All material, fabrication and installation of structure related issues shall be as per General specification/ for material, fabrication and installation of structure- Spec. 6001.

The Scope of Work shall include structural modifications and / or extensions works required for providing process facilities, detailed elsewhere in the bidding document but not limited to following:

- i. Pre-Engineering survey for the proposed modification and or extensions to cater process & piping scope of work indicated elsewhere in the bid.

As-built data supplied by the Company shall be verified with the existing Structures. The structural member thickness verification (using ultrasound method) shall be carried out during pre-engineering survey for all proposed extension / Modification. Chart datum shall be established which is 2.51 m below Mean Sea Level MSL.

- a) Detailed Design & Engineering of Deck extensions & modifications of Deck including Drop object protection, in compliance to Structural design criteria and functional specifications, shall be carried out as per process/piping scope of work provided elsewhere in the bid document.
- b) Detailed Design & Engineering of I/J Tubes, I/J Tube clamps and riser clamps shall be carried out in compliance to Structural & pipeline design criteria and functional specifications.

- ii. Procurement of various materials.

- iii. Fabrication.

- iv. Load-out.

- v. Transportation.

- vi. Pre-Construction Surveys is to be taken up before installation & report to be submitted to Company for review. Data obtained from Pre-Construction Surveys is to be compared with data obtained during Pre-Engineering Survey and remedial action, if any, is to be taken up. Survey for anchor locations is to be taken up to ensure that the required area is free from obstruction and pipelines are at safe distance.

- vii. Installation.

- viii. Post Construction Surveys includes as-built status of Modified Work.

- ix. Supply of loose items as applicable.

- x. As built documentation of the project shall be submitted as defined in Bid document. Daily Progress Reports (DPR) sent from marine Spread shall also be submitted along with As-built documents.

2.3.4.2.1 DECK EXTENSIONS/MODIFICATIONS/STRENGTHENING

The deck extension scope shall be indicated in the Equipment layout drawings prepared after pre-engineering survey. Based on the pre-engineering survey, the Contractor shall confirm the adequacy and install-ability of the proposed deck extension/modification prior to detail engineering.

Scope of work included with required structural modification and / or extension shall meet process and piping requirement with strengthening of existing structural members and joints up to nearest Jacket leg / legs, supported with structural analysis & design for safe load transfer. Demolition of existing facilities/ provisions and or relocation of existing provisions as per scope for accommodating the planned provision are included in

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scope of work. Any problems envisaged for the Deck installation shall be reported in the pre-engineering survey report and feasible solution shall also be proposed. If required, one more-round of pre-engineering survey is to be carried out. The strengthening of existing deck members, if any, from the results of local deck In-place analysis up to nearest deck leg of raw SACS file (before deck extension/modification), provided to contractor by company (if available), is also in contractor's scope of work.

The structural modifications envisaged (indicative) on existing platforms for cellar deck & corresponding indicative main deck extensions on main deck shall be as per piping/ process scope of work. Wherever space is not available on existing deck area, deck extension shall be provided.

Exact location, size and requirement of deck extensions shall be finalized based on pre-engineering survey and approved equipment layout during detailed engineering (refer scope of work of other disciplines for details).

Drop Object Protection shall be provided wherever required for deck extensions, deck modifications, and existing deck areas impacted by the proposed pipeline replacement works, to ensure safety of personnel, equipment, and facilities. The Contractor shall identify such areas based on layouts and operational requirements (Refer scope of work of other disciplines for details) and shall design and implement the required protection as part of the structural works as per structural design criteria 3.4 Part 1.

Adequacy of existing members and load transfer up to nearest deck leg shall be verified and strengthening shall be provided, wherever required.

Deck extension / modification shall be designed for local condition and adequacy of existing members to the nearest truss shall be ensured. Strengthening of existing members, if required, shall be provided by the Contractor. Details of existing supporting members shall be collected by the Contractor during pre-engineering survey. Deck Structural local In-place Analysis shall be carried out as per Structural Design Criteria 3.4 Part-I of Bid for the proposed extensions upto nearest Deck Leg for all Platforms with strengthening of existing structural members & Joints up to nearest Deck Legs. Extended decks shall have proper weather-proof protection to safeguard the critical equipment and instruments.

2.3.4.2.2 RISER PROTECTORS, RISERS, I/J TUBES AND CLAMPS


Riser Protectors, Risers, I/J Tube and clamps shall be removed / re-installed / installed at well platforms as per pipeline scope of work as indicated in the bid document.

Riser Protectors, I/J Tubes and clamps shall be designed in compliance to the Structural Design Criteria. Pre-Engineering Survey shall be carried out for required portion of the Jacket Structure to obtain the support point distances at top & Bottom, Jacket members size, pre-existence of existing under water stub for bottom end support, existence of any obstruction, elevation of Jacket Walkway framing top & other elevations. In case, the existing under water stub cannot be used or not existing, under water stub shall be provided by clamping arrangement. Any obstruction found shall be removed as part of Contractor's scope.

Installation of new I/J Tubes supported by clamps at various levels on platforms for laying of flexible line is in the scope of the Contractor. Pre-Engineering survey shall be carried out for the Jacket Face at various levels to obtain required data for supporting I/J Tubes.

I-Tube/J-Tube is required to be protected by corrosion allowance of 13 mm in splash zone along with protective coating system 3(b) as per clause 13.2.3 of Specification for Protective Coating 2005, in lieu of 5 mm Monel sheathing.

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Scope of Riser size & Riser clamp locations for Riser installation are provided in pipeline scope of work as indicated under basic bid work. The scope includes removal & relocation of existing anodes, clamps (if any) and removal of any other obstructions (non-structural) hampering for installation of Riser clamps for Riser installation.

Local jacket member check is in contractor's scope of work where new clamp installation for riser is required. Loads from all new clamps and existing clamps has to be considered while performing local member check. The structural member thickness (using ultrasound method) shall be carried out during Pre-engineering survey for all proposed location of clamps. Contractor shall decide the location of clamps based on this check.

To maintain electrical connectivity & prevent corrosion, bolt of Stainless steel SS316 shall be provided for riser clamps.

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2.3.5 INSTRUMENTATION

2.3.5.1 GENERAL

This Scope of Work shall be read in conjunction with Instrumentation Design Criteria, Functional Specification for Instrumentation items, Piping & Instrumentation Diagram (P&IDs), General/ Job Specifications, Project Scope of Work and other Technical documents enclosed in the bid package.

Any sub-system/ facility, or, instruments/ equipment/ accessories or any other requirement not specifically mentioned here, but found as required for the “safe operation” and “Maintenance” of the system being supplied for the plant/ platform and needed to meet the functional/ technical requirements as specified in project bid documents shall also be considered to be a part of the Scope of work of this document.

Contractor’s Responsibilities in this Scope of Work for Instrumentation and Control system for all segments/ platforms shall include but not limited to:

- Pre-Engineering Survey, Design and Detailed Engineering for all Instrumentation.
- Procurement, Inspection, Calibration & Testing as per approved Specifications/ Data Sheets/ PS.
- Installation, Field Calibration/ Loop Testing, Integration and Commissioning.
- As Built Documentation.

Wherever equal but conflicting requirements arise between this Scope/ Specification and the referenced documents, such conflict shall be brought to the attention of ONGC in writing. For resolution, unless specified in the Vol-I of the Bidding Documents, the order of precedence shall be:

- National Statutory Requirements (the Law)
- Basic Bid Work (Description of Work/ Scope of Work)
- Instrumentation Design Criteria
- Functional Specifications
- Industry Codes and Standards


In general, for potential replacements and for new instrumentation being considered on individual platforms, the existing field instrument and the systems on the respective platforms shall be surveyed and documented in the pre-Engineering Survey Document for review and approval. The instruments then considered in the design and finalized during the detailed engineering shall be selected to make compatible with the existing control/ monitoring system.

Unless otherwise specified, the term instrumentation shall mean Instruments, Control system and Safety Instrumented System, along with the applicable accessories, utilities, hook-up materials etc.

2.3.5.2 Field/ CCR instruments, monitoring, control and shutdown:

2.3.5.2.1 The instrumentation and control required for the modifications on the platforms envisaged under this project as shown in the P&IDs and the Scope of Work shall be under the Contractor’s scope of work. Supply of all new instruments and hook- up/ installation and commissioning shall be done by the contractor. By default Instrumentation items are to Comply with the requirements of the Area

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Classification NEC Class-1 Div-2 Gas Group C&D). Contractor shall take into consideration all details, necessary for smooth operation and maintenance of platform after successful commissioning.

2.3.5.2.2 In general, the work shall be carried out in line with the existing philosophy of operation of the Platform and without hampering day to day production and processing activities of platform. All jobs shall be planned and scheduled in consultation and permission of process in-charge of platform.

2.3.5.2.3 The instruments/instrumentation system considered in the design and finalized during the detailed engineering shall be selected so as to be compatible with the existing control/monitoring/safety system. The system details of all platforms including configuration shall be collected by the successful bidder during pre-engineering survey. Wherever the existing system is FF (foundation Fieldbus type) the field instruments shall be of FF type, and wherever it is HART, the field instruments shall be of HART type, this shall be surveyed and specified in the pre-Engineering Survey Document for review and approval.

2.3.5.2.4 All required hardware like I/O cards, components etc. and software modification (graphics, logic etc.), required for commissioning of new facilities with OEM's assistance shall be in Contractor's scope. In general, applicable to all platforms, wherever spares are available and identified during pre-engineering survey for use in this project, the used spares (I/O Cards, SCADA Cards, etc.) shall be replenished by Contractor by providing new cards (depending on number of additional I/O counts and as determined by the FS for DCS/ PLC/ IO Modules). The new cards shall be installed and wired as required wherever spare slots are available. Otherwise it shall be supplied and handed over as loose SPARES.

Where Scope of Work requires addition of new PLC/ SCADA RTU on the platform, and the integration of a new PLC/ SCADA RTU to the PLC/ RTU/ DCS system of the same platform or with PLC/ DCS/ SCADA of another Platform, compatibility of the proposed new system with the existing system shall be studied before procurement of such components and same shall be submitted for approvals. Overall system capacity shall be governed by permitted loading of software/ hardware and necessary redundancy and spare capacity as mentioned in IDC and relevant FS.


Separate system security evaluation and mitigation measure shall be taken into consideration and certified by existing system vendor, in case integration is required between two or more systems in the course of detailed engineering. Hardware components (logic valves etc.) used in the existing SDP shall be replenished with new one to one/ compatible (if one to one is obsolete or not in OEM's manufacturing range now) and supplied as 'SPARES' platform-wise. This spare is applicable for all instrumentation systems except for the one to one replacements of field process instruments i.e., Transmitters/ Switches, Gauges, etc.

2.3.5.2.5 Associated accessories, instrument supports, instrument isolation valves, impulse tubing and other installation material for instrumentation (including tube trays, cable trays, tubing air supply distributors, branch cable, MCTs etc.) for the new instruments shall be in Contractor's scope of work.

2.3.5.2.6 During pre-engineering survey, if any existing accessories (such as JB's, cable glands, barriers, isolators, cable/ tray support, cable layout. Instrument relocation, layout, fuses etc.) required for the installation/ commissioning of new instruments (as per P&ID) are identified as non-functional, the replacement of all such non-functional items required for the smooth commissioning of this project are also under the scope of the LSTK contractor. These new components shall be of the same/ compatible make/ model as that of the existing components on the respective platforms.

2.3.5.2.7 The existing instruments/ instrumentation & control system, gas detection system, if any, that are being replaced/ removed shall be dismantled and handed over to the Company (Asset) at location demarcated by them.

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2.3.5.2.8 The scope shall also include, but not limited to Instrument Air/ Gas supply distribution, power supply distribution, loop checking and commissioning of new instruments to cover complete instrumentation need of the projects as per bid document.

2.3.5.3 Scope of Topside Modification works at Platform:

MH ASSET

Sl. No.	Name of the Platform / Complex	Brief Instrumentation SOW at Each Platform
1.	MH Asset (MHN, MHS) MNP, WIN, MNW, BHS, NQP, SHG, SHP,	<p>i. New Instruments as per approved P&IDs and Process SOW.</p> <p>ii. All existing field instruments associated with new facilities/ equipment (as indicated in battery limits in P&IDs and Scope of Work) shall be provided by the EPCI contractor. The Contractor shall hook up the transmitters and switches (as indicated in the P&IDs) with the existing Systems (DCS/ESD etc.) Related graphics and logic shall be configured in HMIs.</p> <p>In case the replacement item is an ‘upgraded version’, the compatibility with other loop instrumentation shall be ensured before finalizing the new upgraded field instrument.</p> <p>iii. The Pneumatic/Electric pressure switches/transmitter associated with the facilities/ equipment (replacement scope) shall be provided by the EPCI contractor as per existing philosophy.</p> <p>iv. If new scope envisages additional I/Os requirement, same shall be installed and interfaced with the existing Control System along with necessary license. Additional I/Os shall be configured in the existing SCADA System/ DCS/ ESD system, as applicable. Relevant System OEM’s support shall be taken by EPCI Contractor under present scope. Upgraded I/O version shall be compatible with the existing Control Sub-system.</p> <p>v. All associated instrument accessories, supports, instrument isolation valves, impulse tubing, air supply distribution and other installation material for instrumentation (cable trays, cabling, MCTs, terminals, JB’s etc.) for the new instruments shall be in EPCI Contractor’s scope.</p> <p>vi. New metering shall be provided as indicated in Process Scope of work, P&IDs.</p>
2.	MH Asset (MHN, MHS) NHA,N14, WO16, ND, N3, NI, N10, N9, IM, SI-6, SB, SA, SP, IG, N12, SJ, RS7, IL, EE, LB	<p>Scope as above in at Sr. No 1 and,</p> <p>i. Process Control and Monitoring shall be done through RTU.</p> <p>ii. Wherever new facilities are envisaged as per P&ID and process Scope of work, a new standalone panel shall be provided to configure the PSHL/ PSHH/ PSLL & XSDV logics. The new shutdown panel shall be interfaced with the existing shutdown panel to implement necessary shut down logics. The integration scheme shall be finalized during detailed engineering.</p> <p>iii. Critical Monitoring Parameter shall be integrated with existing RTU for further transmission to the existing Platform via SCADA.</p> <p>iv. Low power consumption equipment (solenoids, PLC etc.) shall be selected for well head platforms considering low- power availability.</p>

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B&S Asset

Sl. No.	Name of the Platform / Complex	Brief Instrumentation SOW at Each Platform
1.	B&S Asset B12-17, B-12-11	Scope as above in at Sr No 1 and, <ul style="list-style-type: none"> i. Process Control and Monitoring shall be done through RTU. ii. Wherever new facilities are envisaged as per P&ID and process Scope of work, a new standalone panel shall be provided to configure the PSHL/ PSHH/ PSL & XSDV logics. The new shutdown panel shall be interfaced with the existing shutdown panel to implement necessary shut down logics. The integration scheme shall be finalized during detailed engineering. iii. Critical Monitoring Parameter shall be integrated with existing RTU for further transmission to the existing Platform via SCADA. iv. Low power consumption equipment (solenoids, PLC etc.) shall be selected for well head platforms considering low- power availability.

2.3.5.4 F&G System

- i. The existing F&G detectors and the F&G System on the respective platforms shall be surveyed and documented in the pre-Engineering Survey Document for review and approval. The replacements and new instruments, as per the scope of work, finalized during the detailed engineering shall be selected so as to be compatible with the existing control/ monitoring system.
- ii. For all the new hydrocarbon facilities as per P&ID/ Process scope of work, the supply of associated 'F&G detectors and Fusible Plugs' is in the scope of EPCI contractor. The new fire and gas detectors shall be compatible with the existing F&G system/ Control Cards.
- iii. Types of F&G detectors (HC/ H2S/ flame IR etc.) shall be provided as per existing philosophy of the respective platform.
- iv. (a) Where the deck extension is not envisaged Contractor shall provide minimum 2 Nos. of each type (as applicable) of F&G detectors on each platform to cover the new hydrocarbon facilities.
(b) Wherever deck extension is envisaged, Contractor shall provide minimum 3 Nos. of each type (as applicable) of F&G detectors to cover the new facilities on each platform.
- v. New Fusible Plug loop with other required accessories shall be extended from existing loop in the new Launcher/ Receiver area and shall be interfaced with the existing system. The location and quantity of new fusible plugs shall be as per API RP 14C and based on the equipment layout for the upcoming facilities.
- vi. The new tags shall be configured in the existing F&G system retaining the functionality as per existing voting and shutdown philosophy after the provision and inclusion of new components/ cards/ software/ logic changes etc. Necessary OEM support shall be considered by the Contractor.
- vii. Extension of Manual ESD/ FSD stations shall be as per operation & safety requirement and shall be finalized during detailed engineering.
- viii. In line with clause (2.3.5.2 (I.(iv))), wherever spare capacity or components are available in the F&G system, and identified during pre-engineering survey for use in present project, the used components shall be replenished by Contractor by providing equivalent numbers of installed or loose spares.

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- ix. Replacement of detectors where one-one replacement of facilities (in the same location where existing detectors provide coverage) are being envisaged is not in the scope of the EPCI contractor. In case there is a relocation of facilities the existing detectors are to be relocated and connected and mounted appropriately.

2.3.5.5 Related graphics and logic for all the above mentioned scope shall be configured in the respective SCADA Work Station, DCS and PLC system appropriately for the respective platforms. It is the responsibility of the contractor to ensure the interfacing (graphics/ operational requirements as mentioned in process SOW) of all the I/Os (new or replacement) coming up under the scope of this project from the well head platforms to their respective Process Platforms.

Where RTUs are mentioned in the P&ID Scope, the signals are to be transmitted to the respective Process Platform (PP) or a HUB. Configuring the new/ modified parameters and updating of the System PLC/ DCS/ HMI for these parameters at the receiving end (PP or HUB) shall be in Contractor's scope.

2.3.5.6 The Contractor shall visit various platforms to verify the location/ space/ spare availability, make & model of existing system etc. Pre-engineering survey shall be carried out by the Contractor before proceeding with the modification work.

2.3.5.7 It shall be Contractor's responsibility to get the support of respective OEMs of existing systems for any modification/ up gradation/ expansion required for total completion of work as mentioned in Bid Package.

2.3.5.8 Contractor shall provide assistance to OEMs with all necessary tools, tackles, utility etc. during pre-commissioning and commissioning of the various systems envisaged and being provided/ modified/ Expanded (DCS, TIC, ESD PLC, F&G system and Launcher/ Receiver logic control panel) under this project. As in the earlier clauses, all the required new Hardware for existing platforms DCS/ ESD PLC/ F&G PLC like Barriers, I/O cards (analog & digital) etc. for new/ existing field instruments shall be supplied by the Contractor and necessary software changes to incorporate the same shall be contractor's responsibility.

2.3.5.9 Contractor shall be responsible for the smooth operation of new systems as well as the operation of the existing systems which have been modified to take care of the scope of present project. The Contractor shall ensure that the normal operation of the existing systems on the platform is not hampered during and after the modification jobs have been carried out. After successful commissioning of new systems, the same shall be integrated with existing systems.

2.3.5.10 The availability/ suitability and adequacy of resources required for the above mentioned works shall be detailed in the pre-engineering survey report during detailed engineering.

2.3.5.11 Metering

Metering systems shall be provided as indicated in the P&IDs and Process Scope of Work as per the following philosophy-

- I. Magnetic flow meter shall be provided for water injection service as indicated in the P&ID/ Process SOW. The flow transmitter shall have local display. Magnetic Flow Meter shall be provided to cover entire flow range. Meter bypass line with isolation valves shall also be provided.
- II. For lift-gas pipelines, as indicated in the P&ID/ Process SOW, Cone meter alongwith dedicated field mounted MVT with flow computational capability and local display shall be provided. Meter shall be provided to cover entire flow range. Cone Meter Assembly bypass line with isolation valves shall also be provided.

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- III. For lift-gas pipelines, as indicated in the P&ID/ Process SOW, Orifice Flange Assembly with field mounted MVT with flow computational capability and local display shall be provided. Meter shall be provided to cover entire flow range. Orifice meter Assembly bypass line with isolation valves shall also be provided.
- IV. The MVTs/ flow transmitters of all the above mentioned meters shall have a local display. The MVTs/ flow transmitters shall be interfaced with the DCS/ PLC of the respective process platforms for instantaneous and as well as totalized flow. In case of conventional well-head platforms, the transmitters shall be interfaced with a flow totalizer and located in the RTU cabinet room. The totalizer will be interfaced with the RTUs of the respective well-head platform.

2.3.5.12 Details of the Existing System

Detail of existing system, spare and space availability, for integration and hook-up job shall be verified by contractor during pre-bid/ pre-engineering survey.

(A) MH ASSET :

Table-1 : Existing Systems Details at Process Platforms - MH Asset

S. No.	Process Platform/ Wellhead	RTU/ DCS/ PROCESS PLC	ESD PLC/ SDP	F&G PLC
1	MNP			
2	WIN			
3	MNW			
4	BHS			
5	NQP			
6	SHG			
7	SHP			

Table-2 : Existing Systems Details at Wellhead Platform - MH Asset

S. No.	Process Platform/ Wellhead	Type of platform/wellhead (Conventional/ SMART)	RTU/ DCS/ PROCESS PLC	ESD PLC/ SDP	F&G PLC
1	N14				
2	NHA				

3	WO16				
4	ND				
5	N3				
6	NI				
6	N10				
7	N9				
8	IM				
9	SI-6				
10	SB				
11	SA				
12	SP				
13	IG				
14	N12				
15	SJ				
16	RS7				
17	IL				
18	EE				

(B) B&S ASSET :
Table-4_Existing Systems Details at Wellhead Platform : B&S Asset

S.No.	Process Platform/ Wellhead	Type of platform/wellhead (Conventional/ SMART)	RTU/ DCS/ PROCESS PLC	ESD PLC/ SDP	F&G PLC
1	B12-17				
2	B-12-11				

2.3.6 ELECTRICAL

The scope includes Engineering, Procurement, installation, Hook up, commissioning etc. of Electrical facilities as described elsewhere in the bid and cathodic protection system for new rigid, flexible pipelines, I/J tubes and sectional replacement pipelines. The Electrical scope of work shall be read in conjunction with relevant portions of Electrical Design Criteria and Functional specifications in bid package for the complete assessment of electrical work. Bidder should note that any item not mentioned here but nevertheless required to make the system safe and complete shall also be supplied and executed by the contractor.

2.3.6.1 DESIGN AND ENGINEERING

Engineering activities to be performed by Contractor shall include but not limited to the following:

- I. Basic engineering calculations viz. voltage drop calculations, cable sizing, cathodic protection system calculations etc.
- II. Preparation of power distribution scheme.
- III. Preparation of single line diagrams and schematics drawings.
- IV. Preparation of modification area classification drawings.
- V. Preparation of data sheets for electrical equipment.
- VI. Sizing calculations for Cables, cable trays and MCTs etc.
- VII. Preparation of various electrical layouts such as modification equipment layouts, cabling layouts, earthing layouts, etc. including equipment installation and cable termination details.
- VIII. Preparation of control and protection schematics.
- IX. Preparation of final “As Built” drawings and documents.
- X. Any other works/ activities that are not listed above, however, necessary for the completeness of the electrical system.

2.3.6.2 SCOPE OF WORK FOR SUBMARINE PIPELINES

The cathodic protection for sub-sea pipelines, SSIVs and their cages, risers, etc. shall be designed in accordance with functional specification FS 4002 (CP System for Submarine Pipeline) Rev-9.

Scope includes:

- I. Detailed calculations for Cathodic Protection (CP) system for calculating the total quantity of anodes, anode weight, anode output current, & current demand etc.
- II. Preparation of Pipeline Cathodic Protection Design Report.
- III. Development Anode Alignment drawings, Anode installation, Anode distribution drawings.
- IV. Purchase specification for anodes and all procurement activities.
- V. Preparation of "as built" drawings.

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- VI. Any other works/ activities that are not listed above, however, necessary for the completeness of the electrical system

2.3.6.3 SCOPE OF WORK FOR MODIFICATIONS ON EXISTING WELL PLATFORMS

Power required for instrumentation loads under this project shall be sourced from the existing electrical system. Details of the instrumentation load are provided elsewhere in the Bid Package. For this purpose, distribution of electrical power shall be done from existing spare feeders. In the event of spare feeders are not available on the distribution board, modification of switchboard to feed power to the new load or providing one additional small wall mounted distribution board to provide power to upcoming instrumentation loads is included in the contractor's scope of work. All the necessary modifications, cablings, MCT etc. for the modification is in the scope of the contractor.

The contractor's electrical scope of work for all wellhead platforms shall also include the following:

- I. Relocation of any electrical items such as cable trays, junction boxes, lighting pole etc. if required due to deck extension.
- II. Developing area classification drawings for all modification scope, if any.
- III. Preparation of earthing layout drawing.
- IV. Supply & installation of complete earthing for all new launcher/receivers including supply of materials i.e., earthing conductor/cable, nuts & bolts, lugs, washers etc.


2.3.6.4 SCOPE OF WORK FOR MODIFICATIONS ON ALL EXISTING PROCESS PLATFORMS/ SUB SEA CONNECTED WELLHEAD PLATFORM

Power required for instrumentation loads and lighting coming in the platform shall be sourced from existing electrical system. For this purpose, distribution of electrical power shall be done from existing spare feeders. In the event of spare feeders are not available on the distribution board, modification of switchboard to feed power to the new load or providing one additional small wall mounted distribution board to provide power to upcoming instrumentation loads and lighting is included in the contractor's scope of work. All the necessary modifications, cablings, MCT etc. for the modification is in the scope of the contractor.

The Contractor's electrical scope of work for deck extension shall also include the following:

- I. Bidder shall generate area classification drawings for all modification scope, if any.
- II. Supply, installation, testing and commissioning of LED flood lights, cabling and extension of existing lighting circuits as per area classification drawings at extended Deck areas of process platform.
- III. Normal lights, emergency lights, critical lights as required and associated cables, etc. as per Electrical Design Criteria.
- IV. Relocation of any electrical items such as cable trays, junction boxes etc. if required due to deck extension.
- V. Preparation of final "As Built" drawings and documents.
- VI. Complete earthing system for all the equipment including supply of all material i.e., earthing conductor/cable, cad weld kits, nuts, bolts, lugs, washer etc.
- VII. All erection and installation materials required i.e., cable glands, cable lugs, connector, cable tray supports, and structural steel, nuts, bolts, cable tags, cable tie ropes and other required hardware


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etc. shall be supplied by the contractor. Cabling work shall include cable laying, end termination, clamping, tagging, cleating of cables etc.

- VIII. Any other work not specifically mentioned herein but nevertheless necessary for safe operation and maintenance for the completion of the job is included in scope of work. Supply and installation of all accessories as required are included in scope of supply.

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2.3.7 INFOCOM

The instant project scope involves Topside Modification JOBS at various platforms/wellheads of MH, B&S and NH Asset.

(Refer section **2.3.5.3 Scope of Topside Modification works at Platform**)

Signals from the Instrumentation associated with new LAUNCHER/ RECEIVER and other signals indicated in Scope of instrumentation/process shall be integrated with existing RTU through TIJB/ TIC as per respective P&ID in line with the existing philosophy.

The integration of new signals in the RTU through TIC/TIJB shall be in the scope of the project.

Configuration/ Integration of new tags for SCADA system shall be carried out by contractor with the help of expertise services from OEM of existing RTU and SCADA, shall be in the scope of the project

Notes:

- i. Hook up of required signals to the existing TIC/ RTU shall be in the scope of the Contractor. Existing RTU supports HART/ PROFIBUS/ MODBUS/ SERIAL/ FOUNDATION FIELD BUS.
- ii. Any hardware required as per respective P&ID, irrespective of RTU make, new interface cards viz AI, DI and DO along with its base plate cables, wiring, terminations required in RTU to support all type of instrumentation (HART protocol and FF types) envisaged under the project, shall be in the scope of bidder.
- iii. The supply and mounting of new hardware e.g. RTU cards/ module, interface cards/modules, barriers signal isolation, toggle switch fuse cables, wiring and terminations shall be under the scope of the Contractor. The required new components shall be compatible to that of the existing components on the respective platforms.
- iv. Any software/ TAG license required for this modification in existing RTU shall be in the scope of bidder. Configuration, creation of database/ RTU TAGS in the RTU & LPD for all the new additional instrumentation under the project, shall be in the scope of bidder.
- v. Any modification/ configuration required in RTU with respect to additional hardware & software shall be in the scope of bidder.
- vi. Signals from the Instrumentation associated under the scope shall be integrated with RTU through TIJB/ TIC As per respective P&ID in line with the existing philosophy. The integration of new signals in the RTU through TIC/ TIJB shall be in the scope of the project. Suitable FJB(s) (MOC SS 316) to be provided in the present project scope.
- vii. Provision of Cabling from field instruments and from FJB to RTU via TIC shall be provided. Contractor shall ensure that all new electrical and electronic instruments used for telemetry purpose on existing well/ process platforms are compatible with the Company furnished remote telemetry, tele-control and data gathering system.
- viii. In case there is no space for inserting additional IO modules/ cards/ accessories etc. in existing RTU cabinet, another RTU cage/ rack may be provided to accommodate these additional cards/ modules etc. and supplied additional RTU cage/rack shall seamlessly be integrated with existing RTU rack. (The rack should be equivalent to RTU i.e. IP 65 & SS316) II.
- ix. At the respective Process Platforms end, data from the RTU/PLC are to be made available in the existing SCADA HMIs/ DCS by Contractor. All modifications required in the existing SCADA HMI &/ DCS (including hardware & software, creation of SCADA tags/ database/ mimics extension of Licenses, up-gradation/ modification of existing mimics, graphics, trends, alarms etc.) of

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corresponding process platform required for this project and for making the data available in the system shall be included. It shall include supply and installation of necessary hardware for SCADA, DCS/ PLC & annunciator (i.e. I/O cards, controller cards, MCTs, isolators, terminations, etc.) and necessary software modification in main systems and their subsystems (including logic Implementation, graphic display, alarm display, mapping etc.).

Any software/ TAG license required for this modification in existing SCADA System shall be in the scope of bidder.

- x.** Configuration/ Integration of new tags for SCADA system (M/s ABB) & RTUs shall be carried out by contractor with the help of M/s ABB and M/S L&T, shall be in the scope of the project Demonstration of ESD commands and its feedback point through RTU for the new shutdown panel from corresponding SCADA System shall be in the scope of bidder.
- xi.** SCADA System Hardware and Software Details of the upgraded/to be upgraded (in process) SCADA System (Tier-1).

Hardware Details SCADA Server and Workstation:

a. SCADA Server:

- Make : Dell
- Model : PowerEdge R640 Server
- OS : Windows 2019 server edition

b. SCADA Workstation:

- Make : Dell
- Model : Precision 5820
- OS : Windows 201

c. Software details of SCADA System: OS: SCADA Vantage 5.6.5

- xii.** Transmission of parameters to respective process platform from well platforms through Radio / VSATs and necessary modifications at the respective process platform end for receipt of data from the well platform shall be in the scope of the contractor.
- xiii.** Ensuring availability of Radio communication link from WHPs to respective Process Platform shall be the responsibility of Asset.

Verification & testing of data in the SCADA system at Tier-1(Corresponding SCADA System of process platform.

- xiv.** Other General Terms & Conditions applicable for Total Instrumentation, and SCADA Works
 - a.** The selection of the MOC for field instruments shall be as per the Instrumentation Design Criteria and the relevant Functional Specifications enclosed in the bid document.
 - b.** It shall be Contractor's responsibility to get the support of respective OEMs of existing systems for any modification/ up-gradation/expansion required for total completion of work as mentioned in Bid Package.

- c. Contractor shall be responsible for the smooth operation of new systems as well as the operation of the existing systems which have been modified to take care of the scope of this project. The Contractor shall ensure that the normal operation of the existing systems on the platform is not hampered during and after all modification jobs have been carried out. After successful commissioning of new systems, the same shall be integrated with existing systems.
- d. I/O cards, controller cards, MCTs, Isolators, terminations etc. required for integration of the new parameters for the modification jobs at the well head platforms with the RTU/SCADA/PLC shall be provided by the contractor. All components of RTU/ SCADA/ PLC shall be of the same make and model of the existing System in the respective platforms.
- e. The hardware required for integration/configuration with RTU/ SCADA/ PLC shall be of same make and model that of the existing system at respective process platforms and shall be provided by the Contractor. Necessary modification in the Software shall also include all the necessary works such as logic implementation, graphics development, alarm display, Mimic development, Mapping, up-gradation, any additional licensing, compatibility etc. shall be provided by the contractor. In case, new Software is not compatible with the existing Software, necessary Hardware and New Software has to be provided for full commissioning of the system.
- f. Wherever in the project, the replacement of subsea lines including topsides at both the ends have been envisaged, the contractor shall use the existing instrumentations in topsides and relocate the same in the replaced topsides.
- g. Any requirement of tubing, fittings, tags blocks, cables lugs, FJB etc., signal cables including cable glands till the FJBs or any other items required for termination in FJBs shall be in the scope of the Contractor.
- h. Where ever spares are available and identified during pre-engineering survey to use for this project then the used spares shall be replenished by Contractor by providing equivalent installed or loose spares. This is applicable for all instrumentation system including DCS, PLC, and ESD/F&G system and their subsystems (like Hart maintenance system, Advanced Control development &, Supervisory, OPC etc.) where ever applicable.
- i. Where-ever spares in existing systems are not available; Contractor shall provide the required hardware compatible with the existing system and make the system complete and functional after the integration new scope of work. This is applicable for all instrumentation system including RTU, DCS, PLC, and ESD/F&G system and their subsystems (like Hart maintenance system, Advanced Control development &, Supervisory, OPC etc.) where ever applicable.
- j. In case there is any change in Make and OES for RTUs mentioned in the bid at any Platform, the scope like Configuration, termination and up gradation/ up dation in RTU shall be in bidder scope.
- k. In case data (RTU) from any WHP communicating to process platform through Radio mentioned in the Table above changes and communicates to different process platform, then the modification of data like Configuration, termination and up gradation/ up dation in the RTUs well as in SCADA system at changed process platform (tier1) shall be in the contractor scope.
- l. Terminal block TIJB shall be fuse blown indicator type for isolation of Analog and DO, Din I/Os. Conventional Provision of Toggle switches not acceptable.
- m. New Separate FJB for hook-up of I/O points is in bidder scope.
- n. Minimum 08 pair cable from new FJB to TIJB for Analog I/O points and 08 (traic) cables for Din and DO shall be in scope.
- o. Zener isolators shall have Resistance (250ohms) pluggable type.

- p.** Bidder shall provide separate new laptops of latest configuration, loaded with MVT/ FC/ Flow meter licensed software (along with its licensed software CD/ DVD) per process platform (where the data will be received), wherever MVT/ FC shall be installed as per respective P&ID.
- q.** In replacement of topside (as per bid P&ID), the working field instruments topside shall be replace in the new installed Topside. Any additional instruments as per the Bid P&ID shall provide including its tag licenses for RTU/LPD/SCADA server (ABB), creation of graphics shall be in the scope.
- r.** Presently, SCADA system at Process platform has been revamped/ upgraded and some are under revamping/ up-gradation (hardware and software). Addition of I/O tags (soft) and creation of MIMIC in SCADA server and HMIs shall be in the bidder scope.
- s.** Any field instrumentations mentioned above other than Bid P&ID or Bid etc. shall also be in the Bidder scope.
- t.** Bidder to note, During Pre Engineering survey, if there is a change in field instrumentation type either from HART to FF or from FF to HART, the bidder shall follow the same instrumentation type found during Pre-Engineering survey. The remaining part of the scope, terms and condition in the BID shall remain the same.

2.4 CONTRACTOR'S SCOPE OF SUPPLY

2.4.6 The procurement and supply in sequence and at the appropriate time, of all materials (except free issue material i.e., bare (rigid) line pipes for subsea pipeline, risers, subsea spools & bends) and consumables required for the completion of work in accordance with the technical specifications/time schedule shall be entirely the responsibility of the Contractor and his quoted price shall include the provision of all such materials. Contractor's scope of supply shall consist of the following but not limited to:

- i. All materials (subsea flow tee & valves, piping, flanges, fittings, valves, instruments, cables, wirings, structural steel, pipeline materials etc.) including operational/maintenance spares.
- ii. Fabrication of subsea tie-in/expansion spools & subsea bends. Further, procurement of Monel sheets, anodes, SPRU etc.
- iii. All matching flange, gaskets, bolts etc. wherever new piping/instruments are being hooked up to the existing piping.
- iv. All types of welding consumables, electrodes, filler wires etc.
- v. All types of structural members as required for pipe supports, temporary supports, scaffolding materials etc.
- vi. Primers and paints as specified in Spec. No. 2005.
- vii. Spool pipes, blinds, plugs, gaskets and other materials/ arrangement required for testing of pipe work. Radiography/ UT/MPI/DP machines and materials as required for NDT.
- viii. Any other material not-specifically mentioned above but required for completeness of the work as per specifications, drawings and instructions of Engineer-in-charge within, scheduled time shall be the Contractor's responsibility.

2.4.7 The procurement of material shall be from Company's approved Vendor/sub- vendors and necessary documents, test certificates shall be furnished for Company's review/approval.

2.4.8 Transportation of material from Ex-Factory (mill) or ONGC storage yard, as applicable to coating yard /workshop, worksite/field for fabrication/installation including handling, loading/unloading, storage etc. is included in Contractor's scope. However, Pipe line manufacturer is responsible for transporting of pipes from their premises to either ONGC Storage Yard or for loading them onto Contractor's carrier, as applicable.

2.4.9 It shall be the responsibility of the contractor to provide all men and material including Vendor's representatives for execution of the work and hand over the Platform as per the indicated schedule covered elsewhere in the bidding document.

2.5 QUALITY ASSURANCE

Contractor shall include in his bid the quality assurance plan in line with ISO 9001 (Series) latest edition containing overall quality management procedures, which is required to be adhered to during execution of contract. After the award of the contract, detailed QA plans shall be furnished by the Contractor for the Company's approval before commencement of execution.

The Contractor shall establish document and maintain an effective quality assurance system as outlined in recognized codes.

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Quality assurance system plans/ procedures of the Contractor shall be furnished in the form of a QA manual. This document should cover details of the personnel responsible for the quality assurance, plans/ procedures to be followed for quality control in respect of design, engineering, procurement, fabrication, installation, hook-up and testing. The quality assurance system should indicate organizational approach for quality control and quality assurance of all the activities at all stages of work at site as well as workshop. The QA plan needs to be approved by the Company before the commencement of execution.

The company or its representative shall reserve the right to witness/ inspect, review any or all stages of work at shop or site as deemed necessary for quality assurance.

The Contractor has to ensure adequate deployment of quality control and quality assurance engineer depending upon the quantum of work. The QA/ QC group shall be fully responsible to carry out the work as per contract, bid specification and approved QA/QC plan. In case the engineer in-charge feels that the contractor's QA/QC engineers are incompetent or insufficient, Contractor has to deploy other experienced engineers as per site requirement and to the full satisfaction of engineer in-charge.

Contractor's scope includes preparation of welding procedure specification (WPS), procedure qualification records (PQR), Welder Qualification, Pre- qualification of consumable etc., Fabrication of Spool Pieces, Pipe supports, ND testing (UT, DP, MP, RT) including installation, hydro testing, cleaning, flushing, drying, painting, removal of temporary support, scaffolding etc.

2.6 HEALTH, SAFETY & ENVIRONMENT REQUIREMENTS

The Contractor shall be responsible to comply with code requirements of International Maritime Organization (IMO), International Convention of Safety of life on sea (SOLAS), Occupational Safety & Health Administration (OSHA), ISO - 14000 series, American Petroleum Institute (API) RP-14A, 14B, 14C, 14D, 14E, 14F, 14G, 14H, 14J and the international practices and the requirements as stipulated in Vol.-I of the bid document with regards to Health, Safety & Environment. Besides above, Contractor shall follow International Maritime Contractors Association (IMCA) Guidelines or International code of practice for offshore Diving work. Contractor shall indicate proposed code in bid offer.

During pre-commissioning works & modification works on existing platforms, Contractor shall ensure compliance of various activities related to Safety, Health & Environment as per applicable codes and submit the compliance report to Company. The Contractor shall carry out safety studies as per Functional specification for safety studies no: 5101 and carry out necessary changes wherever required as per the findings of the safety studies. The contractor shall provide as a minimum all operation/safety equipment as per Functional safety specifications No.5102 included in the bid package. Any other works specified elsewhere in the bid package.

Contractor shall develop all the applicable reports as per the requirements of IEC 61511, ISA 84 & IEC 61508. As minimum consolidated report shall include Hazard & Risk Analysis, Allocation of Safety functions to protection layers, SIS safety requirements specification, SIL analysis of SIF (Safety Instrumented Functions). Contractor to note that for the purpose of project scope all Guidelines/ Technical report/ Recommended practices sections of IEC 61511, ISA 84 & IEC 61508 are applicable. List of Safety studies (as applicable) shall include but not be limited to the following:

- Hazard & Operability Study (HAZOP)
- Safety Integrity Level (SIL) Study
- Fire & Explosion Hazard Assessment (FEHA)

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- Smoke & Gas Dispersion (SGDA)
- Emergency Systems Survivability Analysis (ESSA)
- Escape, Evacuate & Rescue Analysis (EERA)
- Non-Hydrocarbon Hazard Analysis (NHHA)
- Quantitative Risk Analysis (QRA) & SSIV Study
- CFD Explosion Risk Analysis
- CFD Exhaust Thermal Dispersion Study
- Noise Study
- Acoustic Induced Vibration (AIV) Study

2.7 RESPONSIBILITY OF COMPANY

Company shall make available the as-built documents, drawings and other relevant information to the extent possible depending upon their availability.

The Company will be responsible for the following:

- Review and approval of documentation as per the document approval matrix.
- Provision of relevant Company personnel to attend major project review meetings conducted by the Bidder, including, but not limited to CHAZOP, HAZID, HAZOP's, SIL, QRA, engineering, design, fabrication, constructability, pre commissioning and Commissioning wherever applicable.
- The Company shall provide the Diameter, Material specification & grade of line pipes, however the Contractor shall ascertain the required quantity of line pipes.
- **Procurement of bare (rigid) line pipes for subsea pipelines (includes risers, tie-in spools & bends) shall be the responsibility of the Company.** However, in addition to Company or company appointed inspection agency, the contractor has to carry out the inspection of (rigid) line pipe at pipe factory/mill through third part inspection agency duly approved by the company. The same line pipe will be free issued to contractor.
- The Company shall determine the minimum thickness of concrete weight required for line pipes. The Contractor shall be responsible for calculating the precise concrete thickness based on the detailed design specifications. The Contractor shall also be required to ascertain the anode requirements in accordance with the detailed design.

2.8 RESPONSIBILITY OF CONTRACTOR

The list of Contractor's responsibility shall include but not be limited to the following:

- All surveys such as pre-engineering, pre-construction, post-construction, as built etc. as described in the bid document.
- Design and detailed engineering of all facilities in accordance with design parameters and International Codes and Standards but incorporating changes/revisions which are not adequately covered and reflected, considering that bid document is solely based on functional specifications.

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- Preparation of all fabrication drawings, purchase specifications, specifications and procedures for fabrication, load out tie-down, transportation, offshore installation, hook-up, testing, pre-commissioning and commissioning (wherever applicable) including the existing facilities where modifications are to be carried out or where loose material are to be handed over.
- Procurement (except free issue material) including expediting and inspection of all materials and equipment for construction and incorporation in the facilities. In addition to Company or Company appointed inspection agency, the Contractor has to carry out the inspection of material/equipment through third part inspection agency duly approved by the Company.
- Free issue material (bare line pipe) to be collected from company designated pipe mill for further necessary activity of required coating.
- The procurement of all equipment and material shall preferably be from Company's approved Vendors /Sub-vendors (Suggested Vendors' List enclosed). All necessary documents including test certificates shall be furnished for Company's review and approval.
- Company reserves the right to participate in the selection of vendor for major equipment and items. Vendor, other than those indicated in the suggested vendor list, if proposed then contractor shall notify the company in writing of the name / details of the intended vendor and furnish company with two sets of the vendor's complete technical bid offer including past experience of supplying similar items and all technical correspondence / clarification furnished by the vendor to the contractor. Contractor shall ensure that the vendor's technical offer shall be duly vetted by their engineering sub-contractor incorporating observations / recommendations, before submission to the company.
- Company shall have right to hold detail technical discussion with the vendor and visit vendor's works to satisfy about the vendor's capability to execute the job. The contractor shall issue the purchase order only after written approval of the company regarding acceptance of the selected vendor. Approval of purchase specifications does not absolve the Contractor from supplying equipment of proven design as per company's specification, International codes etc requirements.
- Contractor's scope includes all materials (pipes, flanges, fittings, valves, instruments, cables, wirings, structural steel, pipeline materials etc.) including operational / maintenance spares other than those defined in Company's scope.
- All matching flange, gaskets, bolts etc. wherever new piping/instruments are being hooked unto the existing piping.
- All types of welding consumables, electrodes, filler wires etc.
- All types of structural members as required for pipe supports, temporary supports, scaffolding materials etc.
- Spool pipes, blinds, plugs, gaskets and other materials/arrangement required for testing of pipe work.
- Radiography/UT/MPI/DP machines and materials as required for NDT as per welding Functional Specifications.

- Any other material not-specifically mentioned above but required for completeness of the work as per specifications, drawings and instructions of Engineer-in-charge within, scheduled time shall be the Contractor's responsibility.
- Fabrication and assembly of all facilities including installation of equipment, piping, piping supports, cabling, ducting tubing etc. into the facilities in accordance with approved drawings and specifications.
- Ensuring the effective functionality of cathodic protection systems for submarine pipelines and risers, and if required, executing necessary repairs in accordance with established standards and best practices.
- Load out of all fabricated and bought out components for facilities, coated/wrapped pipelines onto transport barges, sea fastening and transportation to the offshore site in Mumbai High, Neelam & Heera, B&S Fields.
- Removal/ Relocation/ Reinstallation of existing Jacket anodes, Riser protectors, Boat Landing etc. and any other obstructions on existing platforms wherever encountered to carry out the intended scope of work.
- Offshore installation of all facilities hook-up, testing, pre-commissioning and commissioning (wherever applicable).
- Contractor shall perform leak test of all well platforms as part of pre-commissioning work. Further, Contractor shall pre-commission all hydrocarbons handling system and fire suppression system (wherever applicable). All necessary hook up & pressure reduction provisions for taking hydrocarbons for different systems shall be provided by contractor. All such pre-commissioning activities shall be witnessed by Company for their satisfactory completion.
- The commissioning works shall include the confirmation of ready to use status of the facilities and performance of 72 hour run test.
- Procurement and delivery of spare parts for one year of operation and maintenance of the facilities as described elsewhere in the bid document.
- Design engineering of all future facilities as described in the Bid Document.
- It shall be the contractor's responsibility to prepare project documentation including as built drawings & documents, specifications, operation and maintenance manual, vendor data book etc. In addition to the hard copies, soft copies of all as built drawings on DVD/Portable Hard discs using latest version of software shall be provided. During detailed engineering all drawings and documents shall be generated for submission to the company in hard copy as well as electronic form.
- Contractor shall be required to follow Company's on-line documentation system (OPMAC) for uploading and online review of documents, drawings etc.

- Instructions for submission of project documentation including as-built (in addition to the hard copy documents) shall be as follows:

Soft copy: - In electronic format using CD/DVD/Portable Hard Discs media.

Sl. No.	Description	Format
1.	Project Documents	Latest Version of Microsoft Office
2.	Vendor Drawings, Specifications, Operation & Maintenance Manual, Vendor Data Book etc. (All documents pertaining to packaged items delivered by third party)	Latest Version of PDF
3.	All Drawings pertaining to modification job (wherein PDS 3D model creation is not envisaged)	Latest Version of AUTOCAD AND/OR MICROSTATION (As per contractor's convenience)
4.	All drawings for new platform	Latest Version of MICROSTATION ONLY

- The entire Project Management should be done by using Microsoft Project Professional management software, considering all the realistic project data, dates and contract stipulated periods of performances. Any other works specified elsewhere in the bid package.
- Contractor shall furnish all the information as sought by the company in formats for its data storage and retrieval system at no extra cost to company. The formats shall be provided to the Contractor during detailed engineering/ kick-off meeting.
- It shall be the sole responsibility of the contractor to provide the following core PPE items to his personnel for all locations and for all jobs before commencement of the work, as per number and frequency specified below:

S. No.	PPE/Kits and Liveries	Nos. to be issued per person	Frequency of Provision
1	Ready Made Cotton Overall	02 Nos	Every construction season OR condition-based replacement
2	Fire Retardant Overall	02 Nos	Every construction season OR condition-based replacement
3	Industrial Safety Shoes	02 pairs	Every construction season OR condition-based replacement
4	Electrical Safety Shoes (Electrical Hazard rated)	2 pairs (Electrical Personnel)	Every construction season OR condition-based replacement

S. No.	PPE/Kits and Liveries	Nos. to be issued per person	Frequency of Provision
5	Safety Helmet	02 Nos	Every construction season OR condition-based replacement
6	Clear Safety Goggles	02 Nos	Every construction season OR condition-based replacement
7	Ear Muff	02 pairs	Every construction season OR condition-based replacement
8	Hand Gloves (Impact & Cut Resistant)	04 pairs	Every construction season OR condition-based replacement
9	Ear Plugs (reusable)	02 pairs	Every construction season OR condition-based replacement
10	Hand Gloves (Rubber - Electrical)	02 pairs	Every construction season OR condition-based replacement

Note:

All PPE shall bear BIS/EN/ANSI marks with valid certification. In addition, work-specific PPE/Kits & Livery items shall also be provided by the Contractor before commencement of work. Contractor shall mandatorily provide ALL additional PPE required as per OISD-STD-155 based on site-specific Hazard Identification & Risk Assessment (HIRA), Job Safety Analysis (JSA), and Permit-to-Work (PTW) requirements during project execution.

In accomplishing the above tasks, the Contractor will take total responsibility of executing the project in accordance with this bid document including supply of all materials and consumables, construction equipment, labour etc. and will adhere to bid document instructions and requirements in respect of all matters relating to the project.

The contractor shall ensure that all modifications are designed and carried out such that it will have no adverse effect on existing operations of the platforms.

Reference to basic bid work, design criteria, functional/general specification and drawings need to be made by contractor to follow while executing the work described in project description above.