

GENERAL SCOPE OF WORK
FOR
NAPHTHA UNLOADING FACILITIES
FOR RAILWAY SIDING TERMINAL
BRAHMAPUTRA PETROCHEMICAL COMPLEX PROJECT
BRAHMAPUTRA CRACKER AND POLYMER LIMITED (BCPL) – ASSAM

0	13/08/14	Issued with tender	AD	VM	AKG
Rev. No.	Date	Purpose	Prepared by	Checked by	Approved by

1.0 INTRODUCTION

M/s Brahamaputra Cracker and Polymer Limited (BCPL), a joint venture of M/s GAIL (India) Ltd., M/s OIL India Ltd. (OIL), M/s Numaligarh Refineries Ltd. (NRL) and Assam Govt., intends to set up a grass root petrochemicals project in Assam. The project involves setting up a Petrochemicals Complex at Lapetkata, Distt. Dibrugarh, Assam, comprising of a Gas Sweetening unit, C2+ Liquid recovery unit, Gas+ Naptha based Ethylene Cracker Unit, C4 Hydrogeneration unit, Pyrolysis Gasoline unit, LLDPE/HDPE unit and PP unit. The Ethylene Cracker Unit (ECU) is heart of the petrochemical complex. Feed to the unit comprises of C2+ liquid and Naphtha. ECU shall essentially be designed to produce 220 KTPA of ethylene and 60.0 KTPA of polymer grade propylene. The feed source for the cracker complex is primarily gas available at OIL's gas gathering facilities at Duliajan, ONGC's gas available at Lakwa and Naptha available at Numaligarh Refinery Limited, Numaligarh, Assam.

Naphtha will be transported to unloading site via 48 Nos BTPN rail-wagons from nearby Numaligarh refinery. **Railway Siding Facility for Naphtha unloading** is located between Dhamal Gaon and Khowang which is **5KM (Approx.) from Main Plant of BCPL**, Lapetkata, Dibrugarh, Assam. Naphtha shall be unloaded directly from BTPN wagon and simultaneously transferred to Main Plant of BCPL, Lepetkata through underground 20" Naphtha pipeline. Evacuation facilities to be created to decant a 48 wagon rake within 5.0 hours.

2.0 GENERAL SCOPE OF WORK

The scope of work involved in general shall include the following.

- 2.1 Mechanical work related to Piping, General Civil, Structural, Static Equipment, Rotating Equipment, Packaged Equipment for successful completion of composite work at **Naphtha unloading site (Railway siding terminal)** as per the detailed scope of work described in the section-I (scope of work) of technical part.
- 2.2 Necessary co-ordination with Railway Authority or its nominated agency doing the work related to track laying (if required) shall also be in the scope of the contractor.

2.3 Technical part of the tender is divided into following four sections.

- Section – I Scope of work
- Section – II List of Job specifications and Drawings
- Section – III List of EIL standards and specifications
- Section – IV Schedule of Rates (SOR)
- Section – V List of Documents for Procurement of Piping Items

2.4 Refer attached plot plan 6907-160-16-47-0003-Rev F for physical area of the **Naphtha unloading site (Railway siding terminal)**.

SCOPE OF WORK AND SUPPLY- PIPING MECHANICAL WORKS FOR RAILWAY SIDING FACILITIES FOR NAPHTHA UNLOADING

**PROJECT : RAILWAY SIDING FACILITIES FOR
NAPHTHA UNLOADING**

CLIENT : M/S. B.C.P.L

JOB NO : 6907

TENDER NO : 6907-160-16-43-PK-T-3001

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SCOPE OF WORK FOR TENDER (Piping)

The scope of work shall be read in conjunction with standard specification for fabrication and erection of piping, 6-44-0012. The scope of work of contractor shall include the following:

- 1.0 PIPING WORK (PIPING IN NAPHTHA PUMP HOUSE, TRENCH, RAILWAY GANTRY & ASSOCIATED CBD PIPING)**
- 1.1** Shop & field fabrication and erection of piping, installation of specialty items and online instruments in accordance with documents listed under CL. 2.0 i.e., 'BASIS OF WORK' including erection of following materials but not limited to the same.
 - a. Pipes (All sizes and schedules)
 - b. Flanges (All sizes, types and Pressure ratings)
 - c. Fittings (All sizes, types and schedules)
 - d. Valves (All sizes, types and ratings)
 - e. Gaskets (All sizes, types and ratings)
 - f. Studs, Nuts or M/c Bolts (all types)
 - g. Specialty items like SS Flexible Hoses, MOV etc.
 - h. Online instruments like control valves, Safety Valves, orifice flanges, restriction orifice, etc.
 - i. Installation of traps, strainers, sample coolers and online instruments.
- 1.2** Fabrication and erection of pipe supports like shoes, clamps including bolting materials, saddles, guides, dummy pipes, stops, anchors, clips, cradles, hangers, turn buckles, springs used in clamps for pulsating/ vibrating lines, spring washers, supporting fixtures, brackets, cantilevers, struts, tee-posts, including erection of spring supports, expansion bellows, steam and condensate manifolds and sway braces. Bare pipes of all sizes shall be supported with corrosion pad or pad and shoe on pipe rack / sleepers.
- 1.3** Site Fabrication of piping items.
 - a. Fabrication of piping specials like special radius bends, reducers, miters, etc.
 - b. Fabrication of plain and threaded nipples from pipes as required during erection.
 - c. Fabrication of swage nipples as and when required.
 - d. Fabrication of odd angle elbows like 60°, 30°, or any other angle from 90°/45° elbows as and when required.
 - e. Fabrication of flanges, reducing flanges, blind flanges, spectacle blinds, crosses, jump overs etc. as and when required.
 - f. Fabrication of circular pipe for steam rings, fire water lines, utility lines at all levels and elevations.

- g. Fabrication of stub in connections with or without reinforcement.
 - h. Grinding of edges of pipes, fittings, flanges, etc. to match mating edges of uneven / different thickness wherever required as per specifications including beveling of plain end pipes.
 - i. Threading of all small bore piping as per piping material specifications.
 - j. Drilling on blind flange for inserting / joining small bore lines.
 - k. Fabrication and welding of reinforcement pads at branch pipe locations wherever required.
- 1.4 Modifications like providing additional cleats for extension of stem of valve, locking arrangement of valves, providing chain operation facility etc. as and when required.
- 1.5 Transportation of required piping materials (As described in Clause 1.1), pipe support materials (as described in Clause 1.2) and all other necessary piping materials from **Owner's storage point at Main Plant of M/s.BCPL, Lepetkata to Naphtha unloading site(Naphtha unloading site is about 5KM away from BCPL Lapetkata)** or Contractor's storage point (in case of Contractor's scope of supply) to work site / shop including raising store requisitions for issue of materials in the prescribed format & maintaining an account of the materials received from Owner's stores & reconciliation of all Owner supplied free issue materials.
- Making material reconciliation statement and return of owner supplied left over materials to Owner's storage.
- 1.6 Obtaining approval from statutory authority, for drawings prepared by contractor wherever required as per instructions of Engineer-in-charge.
- 1.7 Clause No. 2.6 of Standard Specification for fabrication and erection of piping: 6-44-0012 shall stand modified as below.
- Preparation of Isometrics, bill of materials & supporting details of lines up to and including 1½" related to instruments & pump flushing / cooling, purging, pump vents, drains & Non IBR lines and lines specified as field routed within the unit battery limit including subsequent approval from Engineer-in-charge as and when required is in contractor's scope of work.
- 1.8 Non-destructive examination / testing as per Job Specification for Non Destructive Examination Requirements of Piping Specification No. 6907-6-44-0016.
- 1.9 Fabrication and erection of small structures for pipe supports and valve operation / attending some instruments etc., providing brackets from structures for pipe supports, modification / extension of platforms, providing additional platforms / ladders for improving / providing accessibility, including supply of necessary materials.

- 1.10 Providing insert plates with anchor fasteners in concrete structures / paved floors and repair of platform gratings around pipe openings and providing suitable members for support under the platform grating. Materials required for above are in Contractor's scope of supply.
- 1.11 Flushing and testing of all piping systems as per Standard Specification for inspection, flushing and testing of piping systems No. 6-44-0013. The accessories required for blinding the line like flange, blind flange, gasket (all sizes, type and rating), stud-bolts, flexible hoses etc. are to be arranged by the Contractor. During flushing the discharged water / air shall be drained / routed as directed by the Engineer – In Charge.
- 1.12 Hydraulic bolt tensioning & torquing shall be performed on flange joints as per the requirements specified in "Standard Specification for application of Torque & Hydraulic Bolt Tension for flange joints, No. 6-76-002"
- 1.13 Making connections to underground piping systems erected by other agencies.
- 1.14 Wherever piping class breaks of high pressure / low pressure are involved, the high-pressure circuit shall be tested up to piping class spec. break and the low-pressure circuit shall be tested up to the nearest flange of high-pressure piping.
- 1.15 Positive Material identification during storage and before fabrication as per specification No. 6-82-0002. The instruments required for PMI is to be arranged by the Contractor.
- 1.16 Providing stiffeners for all small bore (1.5" and below) branches. Materials required for above are in Contractor's scope of supply.
- 1.17 Internal grinding of welds of orifice flanges to render smooth surface.
- 1.18 Fabrication of saddles for supports from contractor Supplied carbon steel & stainless steel plates.
- 1.19 All piping must have high point vents and low point drains. All process drains, vents and bleeds used and required for plant operation shall be in accordance with P&IDs. $\frac{3}{4}$ " NB maximum or line size if line size is less than $\frac{3}{4}$ " NB size, valve high point vent and low point drains are to be provided for all systems for hydrostatic / pneumatic testing / flushing. (Refer standard 7-44-350 & 7-44-351).
- 1.20 Contractor shall prepare welding specifications for all weld joints where dissimilar welding will be performed, and obtain approval from EIL.
- 1.21 SOR item for reinforcement pads also includes pneumatic testing of the pads.
- 1.22 Supply and application of primer including surface preparation to piping, pipe supports and structural steel work for pipe supports as per Job specification for Shop & Field Painting (6907-0642-PT-L07) and instructions of Engineer-in-charge.

- 1.23 Any other incidental / intermediate / ancillary or any enabling work not specifically mentioned in any specification but required to complete the work.
- 1.24 Providing marked up As-built GAD's / Isometrics of all lines under the scope of this tender. All As-built drawings shall be approved by the Engineer - in – Charge and shall be supplied in CDs and Hard Copies as per Special Conditions of Contract.
- 1.25 For specific requirements of materials to be supplied by the contractor other than those mentioned in the technical specifications refer General condition of contract and Inspection and testing of contractor supplied items refer special condition of contract.
- 1.26 **Scope at Battery Limit**

Battery limit involves interface between ISBL & Contractor engaged for the Pipeline from this site to Lapetkata.

1.26.1 Interface between ISBL & Pipeline contractor:

Flushing and testing shall be carried out up to Contractor's limit shown in Mechanical drawing. The limit shown is applicable for all elevations along the battery limit. The accessories required for blinding the line with suitable plates are to be arranged by contractor. After testing the plate blind shall be cut and pipe ends shall be prepared as per piping specification.

In case of interface with Pipeline contractor, generally the interface joints are flanged. The boxing up of the flanged joint with offsite piping is included in ISBL contractor's scope.

In case of few welded connections e.g. for steam, FW lines etc., the ISBL contractor shall weld the tie-in joint with piping continued from offsite and radiograph the non-hydro tested joint with Pipeline which shall be available duly beveled. In cases where Pipeline work is not ready at the time of completion of corresponding line in ISBL, ISBL contractor shall weld suitable spool duly blinded to the end of pipe and complete hydro-testing. ISBL contractor shall remove the said welded spool and blind after completion of testing and shall leave the end in beveled condition for welding and tie-in by Pipeline contractor.

2.0 **BASIS FOR WORK**

The complete unit piping work shall be carried out in accordance with the following:

- a. 'Approved for construction' drawings and sketches issued by EIL to the contractor - Plans and / or Isometrics.
- b. Drawings, sketches and documents prepared by Contractor duly approved by Engineer-in-charge. (Such as isometrics of small bore pipes in contractor's scope (refer clause 1.8) and lines required to be field routed etc.)

- c. EIL specifications / Documents as below:
- i) Piping and Instrumentation Diagram (P&ID).
 - ii) Piping Material Specification (6907-6-44-0005)
 - iii) Piping Support Standards
 - iv) Line List
 - v) Job Specification of Non-Destructive Examination Requirement of Piping (6907-6-44-0016)
 - vi) Welding Specification Chart for Piping Classes (6907-6-77-0005)
 - vii) Welding Specification for fabrication of Piping (6-77-0001)
 - viii) Any other EIL or other specification attached with Piping Material Specification or elsewhere and special conditions of contract (such as standard for dimensional tolerances etc.).
 - ix) Procedure for storage, preservation and positive identification of materials at Contractors works/ stores.
 - x) Standard Spec for application of torque & hydraulic bolt tension for flange joints (6-76-0002)
 - xi) Standard specification for corrosion protection tape coating for underground steel pipelines (6-79-0011).
- d. Following Codes, Standards and Regulations:
- i. ASME B 31.3 - Process Piping
 - ii. ASME Sec.VIII - Code for Unfired Pressure Vessel.
 - iii. IS: 823 - Code for Procedure for Manual Metal Arc Welding of Mild Steel (for structural steel).
 - iv. ASME Sec. V - Boiler and Pressure Vessel Code

All the codes referred above shall be of the latest edition, at the time of award of contract.

3.0 **SCOPE OF WORK (Painting)**

The scope of work broadly consists of painting of piping, pipe supports and structural steel work for pipe supports as detailed in schedule of rates, as per

drawings, specification for Shop & Field Painting (6907-0642-PT-L07) and instructions of Engineer-in-charge.

The scope of work shall consist of surface preparation as required, selection and application of required paints on surfaces of piping, pipe supports and structural steel work for pipe supports etc. including but not limited to:

- 3.1 All un-insulated piping and fittings including flanges and valves (including providing identification marks).
- 3.2 All equipments like columns, vessels, heat exchangers, pumps etc. and other miscellaneous equipments as specified.
- 3.3 Painting of surfaces to be insulated as per requirement.
- 3.4 Any other surface as directed by Engineer-in-charge.
- 3.5 Identification, color bands on all painted surface of equipments/ piping. Color coding shall be carried out as per specification for shop & field painting 6907-0642-PT-L07 or client's standard as decided by the Owner and instructions of Engineer-in-Charge.
- 3.6 Identification lettering/ numbering on all painted surface of equipments/ piping.
- 3.7 Hazardous content marking/ identification signs on painted surface of equipments/ piping.
- 3.8 Cleaning up the working areas regularly during the course of work for purpose of good house keeping as well as cleaning up the site on completion of the work as directed by the Engineer-in-charge.
- 3.9 Providing scaffolding for all heights, all other incidental/ auxiliary /ancillary/ accessories, labor, material, tools and tackles/ consumables, supervision etc. or any enabling work not specifically mentioned in the specifications but necessary for the execution and completion of work as envisaged in the tender document.
- 3.10 Fire Water CS piping above-ground shall be painted as per specification.

4.0 SCOPE OF SUPPLY FOR TENDER (Piping)

4.1 OWNER'S SCOPE OF SUPPLY (Except the supply by contractor as per clause 4.3)

- a. CS / SS Pipes (All sizes and schedules in random lengths)
- b. Flanges (All sizes, types and Pressure ratings)
- c. Fittings (All sizes, types and schedules)
- d. Valves (All sizes, types and ratings)
- d. Gaskets (All sizes, types and ratings)
- e. Studs, Nuts or M/c Bolts (all types) except structural bolting.
- f. Specialty items like SS Flexible Hoses, MOV etc
- g. Sample coolers, steam traps, strainers, air traps, hose pipes and hose couplings etc.

- h. Online instruments like Control Valve, Safety Valves, Orifice flange, Restriction Orifice etc.
- i. Pipes for supporting of Piping

4.2 **CONTRACTOR'S SCOPE OF SUPPLY**

The procurement and supply in sequence and at appropriate time of all materials and consumables required for the completion of the works shall be the responsibility of the contractor and prices quoted shall be deemed to be inclusive of such materials.

The supply of these materials shall include but not limited to the following:

- 4.2.1 Tools, tackles and machinery required for cutting, fitting, welding, brazing, cleaning, grinding and threading. All equipments (like torque wrench and hydraulic bolt tensioning equipments) required to tighten the flange joints to desired level.
- 4.2.2 All industrial gases such as oxygen, acetylene, inert gases, all types of electrodes, filler wire, flux wire, brushes, etc.
- 4.2.3 Bolts / Anchor fasteners, nuts, washers, spring washer including hangers, U-bolts with nuts, clamps, graphite and Teflon pads to achieve low friction in supports, line angle, beam etc for pipe supports, structural steel plates / angles / sections for pipe supports, platforms, ladders and stairways and for all miscellaneous structure, supporting steel plates, wires, and strip for attachment of steam tracers etc.
- 4.2.4 Shims, wedges, and packing plates (machined wherever required).
- 4.2.5 All materials such as hydraulic pumps, metallic blinds, temporary gaskets etc. and arrangement required for pressure testing.
- 4.2.6 Supply of MS flats, Anchor fasteners, stiffeners for small bore (1.5" & below) branches, Corrosion pads and Galvanized Chequered plates.
- 4.2.7 Arrangement for compressed air, blinds, temporary gaskets etc. and arrangement required for pneumatic pressure testing. Compressor for pneumatic testing shall be suitable for testing the lines at 7 to 8 Kg/cm²g pressure.
- 4.2.8 All materials and arrangement required for all types of non-destructive tests such as radiography, dye-penetrant, magnetic particle, wet fluorescent test, Pneumatic testing for reinforcement pad, PMI instruments etc.
- 4.2.9 Arrangement & supply of chemicals, consumables, DM water, equipments, boilers, coupons and other testing equipments required for chemical cleaning, pickling & passivation of lines. The contractors shall submit his proposed circuit, which shall be duly approved by EIL.
- 4.2.10 All sealing and protecting materials required for protecting materials / equipments supplied by owner / contractor.

- 4.2.11 Oil, grease, graphite/ Teflon pads, molykote, sealing tapes, cleaning agents including acids for cleaning of internals/packing/through/tray etc.
- 4.2.12 Protective cloth and water hoses for fire and safety protection as required.
- 4.2.13 Davit and Chain pulley block as per requirements.
- 4.2.14 Supply of all items required for erection comprising of:
- Manually operated ground winch
 - Hoisting rope
 - Direction pulley on ground, Guide pulleys
 - Motor for hoisting rope, along with fixing bolts and structural support members, as required.
 - Thimble for fastening hoisting rope to lifting beam.
 - Supports for ground winch and direction pulley with foundation bolts, as necessary.
 - Welding/fixing of bearing brackets on the platform and support arms on the stack.
 - Structural members as necessary for supporting the guides for lifting beam during lowering/hoisting.
 - Tip lowering/hoisting guides.
 - Supply of pipe (IS1239 pipe) for handrails and chequered plates.
- 4.2.15 All safety equipments required for safe conduct the job, avoid accidents and keep good house keeping and environment.
- 4.2.16 Supply, fabrication, welding of hot dip galvanized plates, for earth wire lug connection required for earthing of pipes.
- 4.2.17 Sand for filling the RCC trenches and earth for back-filling the excavated trenches for all under ground piping and under ground vessels.
- 4.2.18 All grouting material required and specified as per EIL Specification, drawings and instructions of the Engineer-in-charge.
- 4.2.19 Structural steel required for modifications / extension of platform, providing additional platforms, ladders, jump overs etc. to improve accessibility, wherever required.
- 4.2.20 All other materials though not specified above but required for completion of the work as per specification, drawings and instructions of the Engineer-in-charge.
- 4.2.21 All consumables and materials required for fire fighting system other than supplied by owner as free issue.
- 4.2.22 Tape/ Tape coating material for under ground piping as required.

4.2.23 All equipments (like torque wrench and hydraulic bolt tensioning equipments) required to tighten the flange joints to desired level. One spare set of torque wrench and hydraulic bolt tensioning equipment shall be handed over to Owner.

4.2.24 Supply of all material required for fabrication of funnels for OWS system as per EIL standard and instructions of the Engineer-in-charge.

4.3 CONTRACTOR'S SCOPE OF SUPPLY (PIPING MATERIAL)

Contractor shall procure and supply piping materials as listed in **Annexure-1 of schedule of rates for mechanical works** (piping). The supply of piping items shall includes following.

- a. Flanges
- b. Fittings
- c. Flexible Hoses

5.0 **SCOPE OF SUPPLY FOR TENDER – (Painting)**

5.1 OWNER'S SCOPE OF SUPPLY

Painting - Nil

5.2 CONTRACTOR'S SCOPE OF SUPPLY

- a. All primers and finish paints as per EIL specifications.
- b. All equipments and consumables required for surface preparation.
- c. All equipments for paint application like brushes, spray, nozzles, spray pumps/ blowers etc.
- d. All equipments like dust collector, protection shield etc. for conducting the job.
- e. Any other consumables and equipments required to complete the job as per drawings, specifications and instructions of Engineer-in-Charge, at all elevations and locations is under Contractor's scope.

SCOPE OF WORK & SUPPLY FOR COMPOSITE WORKS FOR RAILWAY SIDING TERMINAL AT BCPL-LEPETKATA (GENERAL CIVIL WORKS)

B	02.12.2010	REVISED & RE-ISSUED FOR TENDER	P.BANERJEE	G.GHOSH	A.K.GUHA
A	03.08.2010	ISSUED FOR TENDER	P.BANERJEE	G.GHOSH	A.K.GUHA
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1.0 SCOPE OF WORK

The scope of work of this item rate Composite tender shall include fabrication, installation, construction, erection, testing, trial runs ,commissioning, etc. for Fire Fighting system ,Waste water disposal system and associated civil works including supply of all balance materials (except OWNER'S scope of supply) , transporting Free Issue Materials (Mechanical items) to the job site, providing other consumables/non consumables including tools ,tackles, plant machinery, labour etc to complete the entire General Civil Works.

The work shall be carried out as per scope of work described hereunder, Schedule of Rates, EIL specifications, Job specifications, EIL standard drawings, AFC drawings, codes, good engineering practices/ and instruction of engineer-in-Charge. The scope of work shall broadly be as given below but not limited to the following:

1.1 Fabrication, erection /laying/ installation of all underground and above ground fire water piping works for Hydrant system and Medium Velocity Water Spray system.

1.1.1 Hydrant system includes all above ground piping works inside Fire Water Pump House and entire offsite fire water piping works (both under ground and above ground) including installation of all necessary valves (Gate valves, Check Valves, butterfly valves, drain valves etc.), Strainer, Fire Hydrants, Foam/Water Monitors, Hose Cabinet etc..

CORROSION PROTECTION TAPE COATING (JOB SPEC. NO.6907-0642-CTTAPE-C10) shall be provided for all under ground carbon steel pipes upto 500mm above finished ground level and construction of RCC pipe sleepers shall be done for supporting of all above ground piping. Construction of platform for Hydrants and Foam/Water monitors are also to be done for rigidity of these equipments.

1.1.2 Medium Velocity Water Spray system (Manually operated) shall be provided inside the Rail Gantry and inside the Naphtha Unloading under ground pump house. This system includes water spray network (G.I. pipes, threaded connection, break-up flange etc as applicable), Spray nozzles, water feeder lines, all fittings and all necessary structural steel supports including U-bolts & nuts and concrete foundation as applicable.

1.2 Fabrication and laying of underground OWS/CRWS piping (RCC pipes and steel pipes as per drawing) to collect the contaminated floor wash from Rail Gantry and Pig Launcher by gravity. However, collection of contaminated floor wash from Naphtha Unloading under ground pump house shall be by pumping which shall be above ground piping. A centralized OWS/CRWS covered RCC sump shall be constructed (by others) for collecting these contaminated floor wash.

1.3 Fabrication and laying of CBD lines (Steel pipe) for collecting the waste from CBD drain points of Naphtha Unloading under ground pump house. These waste shall be collected to an under ground CBD drum by under ground gravity line.

1.4 Laying of Underground RCC pipe for collecting sanitary waste from Toilet blocks of buildings to the respective Septic Tanks or else if required.

1.5 Construction of RCC manholes for Sanitary waste system and OWS/CRWS waste system.

- 1.6 Construction of RCC pavement at Pig launcher area which shall be done after completion of U/G piping & other piping supports.
- 1.7 Dewatering works, wherever required for all miscellaneous civil works and under ground piping.
- 1.8 Disposal of debris and unserviceable material.

Contractor shall be responsible for completion of works in all respects whether specifically mentioned or not in the contract.

2.0 SCOPE OF SUPPLY:

OWNER'S SCOPE OF SUPPLY

- All mechanical items like Fire Water header & fittings (Carbon Steel, Class- **A97A**), OWS/CRWS header & fittings (Carbon Steel, Class- **A96A**), Closed Blow Down (CBD) header & fittings (Carbon Steel, Class- **A1A**), Gate Valves & all accessories (Material Class- **A97A, A1A & A96A**), Check Valves & all accessories (Material Class- **A97A**), Butterfly Valves & all accessories (Material Class- **A97A**), Drain Valves & all accessories (Material Class- **A97A**), Fire Hydrant & accessories, Water/foam Monitor & accessories, Hose Cabinet and Spray nozzles.

- All pumps as described in RED technical part.

CONTRACTOR'S SCOPE OF SUPPLY

- All balance items (excluding Owner's scope of supply) consumables/non consumables required to complete the job.
- All tools tackles, plant machinery, labour etc to complete the job.

3.0 LIST OF STANDARD DRAWINGS

Standard No.	Title	Rev.	Rev. Date	Pages	Size
7-65-0001	Abbreviations, legends and equipment symbols.	3	01/10/09	4	A4
7-65-0204	Catch basin (offsite) for depth ≤ 2.5 m.	5	19/05/09	1	A4
7-65-0206	Grating detail for catch basin (for both steel & galvanized material).	3	19/05/09	1	A4
7-65-0211	Details of rungs for manholes, valve pits, tanks, etc.	3	19/05/09	1	A4
7-65-0212	Standard miscellaneous details for manholes.	2	16/10/06	1	A3
7-65-0213	Conc. Bedding and encasement for pipes.	3	08/10/07	1	A3
7-65-0219	Vents for manholes.	3	20/05/09	1	A3
7-65-0230	Typical detail of bend pipe for manholes.	2	11/09/06	1	A4
7-65-0256	Manhole type-6 for depth ≤ 3 m, ($\phi \leq 800$).	3	12/01/07	1	A3
7-65-0260	Manhole type-10 for depth < 3 m, ($\phi < 500$).	3	26/12/07	1	A3
7-65-0261	Manhole type-11 for depth < 5 m, ($\phi < 800$).	3	26/12/07	1	A3
7-65-0263	Manhole type-13 for depth ≤ 5 m, ($\phi \leq 800$).	3	15/05/07	1	A3
7-65-0264	Manhole type-14 for depth ≤ 3 m, ($\phi \leq 500$).	3	26/12/07	1	A3
7-65-0265	Unit drainage details (for catch basin type-3).	3	26/12/07	1	A3
7-65-0266	Unit drainage details (equipment drain funnels).	2	11/09/06	1	A3
7-65-0269	Unit drainage details (CBD & ABD header laying detail).	3	29/04/08	1	A4
7-65-0270	Unit drainage details (clean out for C.B.D header).	3	08/10/07	1	A3
7-65-0271	Unit drainage details (typ. branch connection for C.B.D./O.W.S).	2	12/11/07	1	A3
7-65-0273	Unit drainage details (manhole combined with double valve pit).	3	08/10/07	1	A3
7-65-0404	R.C.C. pavement details.	2	09/02/05	1	A3
7-65-0415	Details of anchor sleepers.	3	10/03/08	1	A3
7-65-0420	Installation details of fire water hydrant.	2	08/10/07	1	A3
7-65-0421	Installation details of water monitor or water cum foam monitor, long range foam/water monitor.	1	08/10/07	1	A3
7-65-0422	Assembly & erection arrangement for precast sleeper	2	29/04/08	2	A4
7-65-0428	Concrete sliding sleeper precast type-1B	1	12/01/06	1	A4
7-65-0429	Concrete sliding sleeper precast type-2B	1	12/01/06	1	A4
7-65-0433	Concrete sliding sleeper precast type-1A	1	12/01/06	1	A4

4. LIST OF STANDARD SPECIFICATIONS

Specification No.	Title	Rev	Rev. Date	Pages	Size
6-65-0006	Standard specification for earthwork for underground piping.	2	16/02/06	7	A4
6-65-0018	Standard specification for road & flexible pavements. (upto WBM layer).	6	12/03/08	11	A4
6-65-0019	Standard specification for concrete pavement.	2	20/01/05	10	A4
6-65-0027	Standard specification for underground and above ground G.I. pipeline system (water services)	3	12/03/08	5	A4
6-65-0030	Standard specification for fabrication and laying of underground piping.	3	29/04/08	11	A4
6-65-0035	Standard specification for misc. civil & structural works for U/G piping & other civil works	2	16/04/09	7	A4
6-65-0036	Standard specification for underground C.I. piping system.	2	05/04/06	8	A4
6-65-0042	Standard specification for underground sewer system - pre cast R.C.C. pipes.	2	05/04/06	7	A4
6-68-0001	Technical specification - civil and structural works - general scope.	3	26/02/08	4	A4
6-68-0002	Standard specification civil & structural works materials.	3	19/06/09	16	A4
6-68-0003	Standard specification civil & structural works earthwork.	4	19/06/09	14	A4
6-68-0004	Technical specification - civil & structural works - plain & reinforced cement concrete	4	23/11/07	30	A4
6-68-0008	Standard specification- civil & structural works - miscellaneous steel works	5	10/06/08	12	A4
6907-6-44-0005	Piping material specification	2		27	A4
6907-0642-PT-L07	Job specification for shop & field painting for BCPL, Assam	0	17/12/07	47	A4
6907-0642-CTTAPE-C10	Job specification for corrosion protection tape coating for under ground pipelines.	0	04/03/10	14	A4

5.0 LIST OF INSPECTION TEST PLANS

SL. NO.	TITLE	Document No.	Rev. No	Pages
1.	Inspection Test Plans Mechanical works	6-82-1100	1	107
2.	Inspection Test Plans Civil, Structural & Architectural works	6-82-1700	1	65

6.0 LIST OF DRAWINGS

SL. NO.	TITLE	DRAWING NO.	REVISION NO.
1.	Overall Plot Plan Railway siding Facilities For Naptha Unloading	6907-160-16-47-0003	F
2.	Layout of Fire Water System	6907-160-16-47-0402	0
3.	Fire Water Pump House GA & PIPING LAYOUT OF FW PUMP HOUSE AND RESERVOIR	6907-160-16-47-1506	B
4.	Layout of OWS & CRWS System	6907-160-16-47-0403	A

7.0 SCHEDULE OF RATES FOR GENERAL CIVIL WORKS

SOR no. 6907-160-52-47-SR450

STRUCTURAL

SCOPE OF WORK & SUPPLY

FOR

COMPOSITE WORKS FOR
RAILWAY SIDING TERMINAL AT LAPETKATA,
BRAHMAPUTRA CRACKER AND POLYMER LIMITED
(COMPOSITE WORKS)

0	06.07.2010	ISSUED FOR TENDER	MH	MLSP/GG	AKG
Rev. No	Date	Purpose	Prepared by	Checked by	Approved by

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SCHEDULE OF RATES (Document No6907-160-52-48-SR450)

1.0 SCOPE OF WORK:

The Scope of Work involved in general shall include all Civil/ Structural activities required for successful completion of Composite works. It includes the following but not limited to the same:

- RCC works in the substructure for pipe supports, platforms, miscellaneous equipment foundations etc. including associated earthwork, shuttering and disposal of surplus earth / debris etc. to any place inside/ outside the plant boundary limit as allocated by owner / as per the directions of Engineer in-Charge.
- RCC / PCC works in superstructure for pipe supports, equipment foundations etc. including associated works like shuttering, curing, placing and fixing of insert plates, anchor bolts etc wherever required.
- Providing and fixing foundation bolts and base plate including grouting wherever required.
- Structural steel works for platforms and ladders around equipments wherever required, equipment supports, pipe / valve supports etc., independent on foundation or fixed to an already erected structure wherever required.
- Providing and fixing electro-forged hot dipped galvanized welded MS grating at all heights on structures, platforms, stairs etc wherever required.
- Providing hand railing around walkways, platforms, stairs etc wherever required.
- Supplying and applying of field primer and finish paint to all structures.
- Dismantling and re-erecting of structural steel work wherever required.

- Dismantling / chipping of existing concrete structures, wherever required.
- Any other item not specifically mentioned but required to complete the work as per the directions of the Engineer-in-Charge.

2.0 SCOPE OF SUPPLY

2.1 OWNER'S SCOPE OF SUPPLY

- Nil.

2.2 CONTRACTOR'S SCOPE OF SUPPLY

- All materials consumables/non-consumables tools, tackles etc. required for all Composite works under this contract for the satisfactory completion of the job shall be in the scope of contractor.

3.0 PREAMBLE TO SCHEDULE OF RATES

1. Type of cement to be used for all structures shall be Ordinary Portland Cement , Sulphate Resistant Cement, Portland Pozzalana Cement or Portland Slag Cement conforming to IS:8812, IS:12330, IS:1489 and IS:455 respectively. Cement shall be of minimum 43 grade.
2. Type of Reinforcement Steel bar to be used shall be HSD steel bars of grade Fe500 conforming to IS: 1786 shall be used for all RCC works. 18 gauge SWG wires shall be used for binding reinforcement bars. Ignore Fe415 appearing in any Standards/Specifications, elsewhere in this tender.
3. Minimum cement content for PCC and RCC shall be 275 kg/m^3 and 350 kg/m^3 respectively.
4. Maximum water – cement ratio for PCC and RCC shall be 0.50 and 0.45 respectively.

4.0 SPECIFIC REQUIREMENTS

1. For steel structures, field welding shall be minimized by employing modular construction to the extent possible.
2. Fabrication of anchor bolts shall be taken up on priority to ensure placement of the same at the time of concreting.

5.0 LIST OF ATTACHMENTS

5.1 SPECIFICATIONS

S No	Specification Number	No. of Sheets	Rev.	Title
1	6-68-0001	04	3	General scope
2	6-68-0002	16	3	Materials
3	6-68-0003	14	4	Earthwork
4	6-68-0004	30	4	Plain and Reinforced Concrete
5	6-68-0006	24	5	Structural Steel Works
6	6-68-0008	12	5	Miscellaneous Steel Works
7	6-68-0012	6	3	Demolition and Dismantling
8	6-68-0013	08	2	Miscellaneous Items
9	6907-0642-PT-L07	47	0	Job Specification for Shop & Field Painting

5.2 STANDARDS

S No	Standard Number	No. of Sheets	Rev	Title of document
1	7-67-0008	01	5	Pedestal for Stair/Ladder
2	7-68-0052	01	5	M.S. Rungs for Concrete Structure
3	7-68-0056	07	5	Metal Insert Plates
4	7-68-0062	01	4	Typical Cranking Detail of Rebar at Beam & Column Junctions.
5	7-68-0101	07	4	Standard Rebar Shapes & Cut Length Computation
6	7-68-0102	01	3	Adjustment of Stirrups at Beam Crossing
7	7-68-0106	01	5	Standard Lap Length for Rebars
8	7-68-0202	01	5	Typical Grating Support
9	7-68-0211	01	4	Beam to Beam and Beam to Column connection details

10	7-68-0251	06	4	Welding Symbols
11	7-68-0417	07	6	MS Anchor Bolt Assemblies
12	7-68-0501	8	6	Handrail
13	7-68-0506	06	5	Steel stairs
14	7-68-0563	04	3	Pipe Sleepers Cross-Over
15	7-68-0626	17	3	M.S. Rungs for Concrete Structure
16	7-68-0654	02	2	Detail of Moment Connection for MC [] Column to MC [] Beam
17	7-68-0660	04	1	Typical Detail of Moment Connection with MB Column to MB Beam.
18	7-68-0689	04	1	Shear Connections welded type-Beam to Beam
19	7-68-0697	06	0	Electro-forged grating type-I & II

6.0 AMENDMENTS TO SPECIFICATIONS AND STANDARDS

6.1 AMENDMENTS TO SPECIFICATIONS

S No	Specification Number	Clause No.	Modifications
1	6-68-0003	5.18.3	Clause k to be added as follows: "Lowering of water table and well point pumping method".
2	6-68-0003	5.18.4	This clause stands deleted.
3	6-68-0006 and 6-68-0008	ALL Relevant	Painting Specification 6-44-0004 to be replaced with 6907-0642-PT-L07.

6.2 AMENDMENTS TO STANDARDS

S No	Specification Number	Clause No.	Modifications
1	7-68-0506 and 7-68-0563	ALL Relevant	Substitute '7-68-0697' for '7-68-0561'.
2	7-68-0626	Note 3(Sheet 1 of 17)	Substitute 'M30 for 'M20' and 'M15'.

STATIC EQUIPMENT INPUT FOR MECH. WORKS

PROJECT: BRAHMAPUTRA PETROCHEMICAL
COMPLEX, ASSAM

CLIENT : M/s. BCPL ASSAM

UNITS : RAILWAY SIDING TERMINAL AT
LEPETKATA

B	24.08.2010	REVISED & ISSUED WITH TENDER	BVK	PB	AKG
A	31.05.2010	ISSUED WITH TENDER	BVK	PB	AKG
Rev. No	Date	Purpose	Prepared by	Checked by	Approved by

SCOPE OF WORK OF ERECTION CONTRACTOR

1.0 Pressure vessels

The scope of work and supply of contractor shall be as per Schedule of rates (Doc. No. 6907-160-52-46-SR450) and specifications, standards appearing in the list of attachments furnished below.

2.0 GENERAL

2.1.0 Abbreviation used

EC Erection contractor/turnkey contractor
EIC Engineer-in-Charge (designated by EIL)

2.2.0 SCOPE OF WORK OF ERECTION CONTRACTOR

The scope of work for the EC as per schedule of quantities given in the mechanical tender shall include the following as a minimum:

2.2.1 Leveling, aligning, grouting and completing the work in all respect as per drawings, specifications and instructions of the EIC.

2.2.2 Mounting of instruments like safety valves, rupture discs, sight glasses, etc. as required-

2.2.3 The EC shall take proper care to avoid undesirable corrosion during various stages of erection and prior to pre-commissioning activity.
In addition to the above, EC may be called upon to do other jobs like rectification of defects etc. as per instructions of EIC.

2.3.0 SCHEDULE OF COST

2.3.1 EC shall include in his cost for carrying out work as per Para 2 above for the underground vessel as given in the 'SCHEDULE OF QUANTITIES'.

All equipment, consumable and other Accessories required for completion of the job shall be arranged by the EC. This would include but not limited to, cranes, tools and tackles, manpower, instruments like plumb line, theodolite etc. for checking the erection, hydrostatic testing pumps, potable water, pressure gauge, hoses blinds etc. for hydrotesting and shims and wedges & other consumable for alignment & grouting.

2.3.2 EC shall also supply the base plate to be installed on the sliding foundation. The dimensions of the base plate shall be as per the foundation drawings enclosed with tender.

2.4.0 ERECTION

2.4.1 Leveling and plumpness shall be approved by EIC and shall be checked using theodolite before grouting and final finishing of the foundations. The record of the same shall be maintained.

3.0 LIST OF ATTACHMENTS

SL. NO.	DESCRIPTION	DRAWING NO.	SHTS	REV.
1.	Equipment details for erection (Vessels)	6907-160-16-46-EE-001	2	A
2.	Equipment details for painting (Vessels)	6907-160-16-46-EP-001	2	A
3.	Schedule of rates	6907-160-52-46-SR450	2	0
4.	Job Spec. for Shop & Field Painting	6907-0642-PT-L07	47	0
5.	MDS for 160-UV-01(Naphtha Unloading CBD)	6907-141-16-46-DS-3066	3	3
6.	Nozzle orientation for 160-UV-01(Naphtha Unloading CBD)	6907-160-52-43-4001	1	3
EIL Standards and Specifications				
7.	Std. Specification for Boiler Quality Carbon Steel Plates	6-12-0011	6	6
8.	Std. Specification for Weldable Structural Quality Steel Plates	6-12-0014	5	4
9.	Standard specification for erection of equipment and machinery	6-76-0001	22	2
10.	Internal flanges	7-12-0018	1	4
11.	Standard bolt hole orientation	7-12-0015	1	4
12.	Instruction to vendor for quality data requirements	6-78-0001 & 6-78-0002		0

4.0 NOTES

- Adherence to the requirements of contract specifications, Standards, Codes and Statutory regulations shall be the responsibility of the contractor. Approval of drawings (if any) by EIL will not absolve the contractor from his responsibility of supplying the items strictly as per the requirements of the tender. In case any deviation is found on a later stage the contractor shall rectify the same without any extra charge to the owner and without any extension of time unless permission for such deviations have been granted in writing by EIL, in the form of a deviation permit/letter.

JOB SPECIFICATION FOR MECHANICAL ERECTION & PRE-COMMISSIONING OF ROTATING EQUIPMENT

COMPOSITE WORKS TENDER

(Tender No. 6907-160-16-43-PK-T-3001)

PROJECT : BRAHMAPUTRA PETROCHEMICAL COMPLEX
SITE : LAPETKATA
CLIENT : M/s. BCPL
JOB NO. : 6907

A	16/08/2010	ISSUED FOR COMPOSITE WORKS TENDER	AS	SB	AKG
Rev. No	Date	Purpose	Prepared by	Checked by	Approved by

1.0 SCOPE

- 1.1 This specification along-with EIL standard specification (6-76-0001) defines the minimum requirements concerning mechanical erection and pre-commissioning work related to Rotating Equipment referred to in this tender document.

The term Rotating Equipment covers all Pumps etc. along with their respective drivers including accessories and auxiliary systems as required for the driver/driven equipment covered in this tender document.

2.0 APPLICABLE DRAWINGS, SPECIFICATIONS AND CODES:

- 2.1 Refer following Standard Enclosed elsewhere for additional requirements:

Standard Specification Description	Standard Specification No.
Standard Specification for Erection of Equipment and Machinery	6-76-0001 Rev. 2

- 2.2 The Owner will provide the following documents, which shall be followed for mechanical erection of Rotating Equipment.

- (a) General Arrangement drawings with outline dimensions including layout and foundation details
- (b) Manufacturer's instruction manuals/erection drawings as available from them

3.0 PREPARATION FOR MECHANICAL ERECTION OF ROTATING EQUIPMENT:

- 3.1 For large and critical equipment vendor's representatives shall be present at site on the equipment arrival dates. He shall help the Engineer-in-Charge at site and the Mechanical Contractor to identify the boxes/packing(s) received with respect to the packing list. He shall help in identifying every item as per the packing list sent by the vendor. The entire material shall be issued to the Contractor by the Engineer-in-Charge. The Contractor will return all the unused material / items identifying as per the packing list to Engineer-in-Charge to store at the Owner's Stores.
- 3.2 The Contractor shall carefully study the vendor drawings, manuals and other data before start of the job to ensure correct erection, alignment and commissioning.
- 3.3 In case any of the Rotating Equipment is received in knocked down condition, the various parts shall be assembled as per the instructions of the Engineer-in-Charge and as per manufacturer's instructions. All parts of the equipment shall be thoroughly cleaned with solvents to remove protective compounds if any, before assembly.
- 3.4 All protective and safety guards shall be installed and all foundation bolts shall be checked before starting the trial runs.

4.0 PRECOMMISSIONING WORK:

- 4.1 All the piping i.e. either main or auxiliary (for utilities) shall be cleaned (steam / water flushing) and then connections completed or manpower as required for this purpose shall be provided by the Contractor depending on the contract / P.O. All site fabricated piping shall be hydrotested.
- 4.2 The contractor shall do very initial charge (for flushing/cleaning of systems) of the lubricants. All the oil systems are run, flushed and the oils are changed by other fresh charge.
- 4.3 C.W., Lube Oil, seal oil / gas and all other auxiliary systems shall be run / operated at rated pressures and the leaks shall be checked and corrected. Contractor shall include in his scope, supply of initial fill of lubricants for all Rotating Equipment as listed.
- 4.4 All temporary strainers shall be installed and their cleanliness checked.

5.0 HANDING OVER FOR COMMISSIONING:

- 5.1 After the mechanical completion while handing over to the client or to the commissioning agency, the Contractor shall provide a list of construction defects, rectified by them. The Owner or commissioning agency will check the Contractor's work before taking over.
- 5.2 The Contractor shall also provide a team of skilled labour to client or to the commissioning agency during their commissioning period if requisitioned by them.
- 5.3 If some defects are noticed during commissioning and are attributed to Contractor, the Contractor shall arrange to rectify same to the satisfaction of Engineer-in-Charge.

SCHEDULE OF QUANTITIES FOR ALL EQUIPMENTS WITH DRIVERS AND ACCESSORIES

S. No.	EQUIPMENT ITEM NO.	QUANTITY (Working/ Standby)	TYPE OF EQUIPMENT	TYPE OF DRIVER	NO. OF UNITS X TOTAL WEIGHT EACH EQUIPMENT [(Main Eqpt. + Coupling + Baseplate) + (driver) + Aux. Eqpt. (Seal plan/Piping)] (kgs)	OVERALL DIMENSIONS (L x W x H) (mm) (♣ ♦)
1.	160-PA-01 A/B/C/D	3 W + 1 S	Horz. CF Pump	E. Motor	4 x [(2000+50+800)+(1600)+(300)]=19 T	4 m x 2.5 m
2.	160-PA-002 A/S	1 W + 1 Warehouse Spare	Vert. CF Pump	E. Motor	1 x [(750+50) + (200)] = 1 T	Ø 1 m x 6 m
3.	160-PA-101/102	1 W + 1 S	Vert. CF Pump	E. Motor	2 x [(820+10+50) + (420)] = 2.6 T	Ø 1 m x 5.5 m
4.	160-PA-103/104	2	Vert. CF Pump	E. Motor	2 x [(1000+30+70) + (1800)] = 5.8 T	Ø 1.2 m x 5.5 m
5.	160-PA-105/106/107	3	Vert. CF Pump	Diesel Engine	3 x [(1000+30+170) + (2000)] = 9.6 T	Ø 1.2 m x 5.5 m
6.	160-P-01 A/B	1 W + 1 S	Horz. CF Pump	E. Motor	2 x [(250+25+75) + (150)] = 1.0 T	1.2 m x 1.0 m
7.	160-P-02 A/B	1 W + 1 S	Horz. CF Pump	E. Motor	2 x [(250+25+75) + (150)] = 1.0 T	1.2 m x 1.0 m
TOTAL →					40 T	

Notes :

- ♣ Overall dimensions for horizontal equipments is the base-plate dimensions only (i.e. LxW only). For vertical equipments the same shall either be mounting plate diameter or mounting plate dimensions (i.e. or LxW) along with the height of equipment with its driver.
- ♦ Elevation of Equipment shall be as per the Layout Drawing.

Remarks :

- (1) The figures indicated above are indicative figures only. Final figures shall be intimated during detail engineering only upon finalization of equipment vendor. Bidder shall quote for Unit price and Total price accordingly.

**SCOPE OF WORK AND SUPPLY
FOR
AIR CONDITIONING SYSTEM
(PACKAGED EQUIPMENT DEPARTMENT)**

A	28.07.2014	ISSUED FOR TENDER	PD	PB	TM
Rev. No	Date	Purpose	Prepared by	Checked by	Approved by

1.0 SCOPE OF WORK AND SUPPLY

- 1.1 The intent of this specification is to outline the purchaser's requirement for Air Conditioning System for Control room and UPS room of Lepetkata Railway siding facilities for Naptha unloading as per table below.

Sr No	Room Description	Required capacity	Type of AC	Qty	Capacity	Remarks
1	Control room	6TR	Cassette type	4 Nos	3 TR each	2 working+2 standby
2	UPS Room	2TR	Split AC	2 Nos	2 TR each	1 working+1 standby

- 1.2 Contractor shall supply, transport, install and commission of above mentioned 4 nos 3 TR capacity Cassette type AC and 2 nos of 2 TR capacity Split type AC complete with all accessories and fittings. Contractor shall also supply insulated refrigerant piping, controls and line accessories, initial charge of refrigerant, oil and lubricants.
- 1.3 Contractor shall also do electrical and civil works as required including the structural steel framework, pedestal to mount the indoor/outdoor units, supports for indoor/outdoor units, supports & clamps for refrigerant piping/cables, stabilizer, hold down nuts & bolts.
- 1.4 Contractor shall supply Spares for commissioning and start up. Cost of these spares shall be included by contractor in the lump sum cost of equipment.
- 1.5 Contractor shall handle, transport from purchaser's store to work site and shall also make arrangements for storage at work site, assembly at work site, installation, testing, site painting if required, pre-commissioning, commissioning, testing, performance guarantee run and handing over to purchaser.
- 1.6 The system supplied shall be complete in every respect ready for installation and operation and any item not specifically mentioned in this specification but nevertheless required for proper design, operation, maintenance and safety of the equipment/personnel shall be deemed to have been specified by the purchaser and shall be included in the scope of supply of the contractor.

2.0 SAFETY REQUIREMENTS

- 2.1 It is the intent of the Purchaser that operational hazards be reduced to a minimum. Contractor shall use sound engineering judgment to complete an installation that will perform the required function without compromising this aim.
- 2.2 Electrical devices shall meet the requirements for the area classifications in which they are installed.

2.3 The requirements of Noise Limits and Equipment Vibration as defined in the standard specification shall be met. In general OSHA requirements shall be complied with.

3.0 TECHNICAL SPECIFICATION FOR AIR CONDITIONING

- 3.1 The air-conditioning is required 24 hours per day, 365 days per year.
- 3.2 Fresh air to be provided in control room through cassette AC diffuser. Minimum 68 CFM capacity fan to be provided for fresh air arrangement.
- 3.3 For electrical power connection, refer electrical specification.
- 3.4 Split unit shall have wall mounted indoor unit and remotely located air cooled condenser (outdoor unit)
- 3.5 Cassette unit shall have ceiling mounted indoor unit and remotely located air cooled condenser (outdoor unit)
- 3.6 Suitable access for maintenance of Outdoor unit to be provided by contractor.
- 3.7 Contractor supplied model (AC) shall have sufficient Proven Track Record (atleast same model shall be in satisfactory operation for minimum one year).
- 3.8 Cassette units shall work in 2 working+2 standby configurations. Two units shall run for 12 hours and then other two units shall run for another 12 hours.
- 3.9 Split units shall work in 1 working+1 standby configuration. One unit shall run for 12 hours and then other unit shall run for another 12 hours.
- 3.10 Contractor shall purchase cassette and split AC as per below approved makes.
- 3.11 Approved makes:
BLUE STAR, CARRIER, DAIKIN, HITACHI, LG, LLYODS, MITSUBISHI, PANASONIC, SHARP, VIDEOCON, VOLTAS

4.0 DATA SHEET FOR CASSETTE / SPLIT TYPE AC:

A	OPERATING CONDITIONS	
1.0	Make	
2.0	Model No	
3.0	Capacity	
4.0	Refrigerant (Type / Qty)	/
5.0	Quantity (Nos.)	(Working + Standby)
6.0	Overall noise level (DB)	
B	TECHNICAL DATA	
	Out door unit	
1.0	Compressor	
1.1	Type	
1.2	Quantity of Compressors per unit	Nos

1.3	Make	
1.4	Model	
1.5	Shaft Speed	RPM
1.6	Enclosure	Sealed/Open/Semi hermetic
1.7	Nominal Capacity	TR
2.0	Condenser	
2.1	Type	Air Cooled
2.2	Cooling	TR
2.3	Heat Rejection	
2.4	Quantity of condenser per unit	Nos
2.5	Fan motor rating	HP/
2.6	CFM	m ³ /hr
	Indoor Unit	
1.0	Blower	
1.1	Type	
1.2	No. of blower per unit	Nos
1.3	Type of blades	Forward/Backward/Radial
1.4	Air flow rate	CFM
1.5	Blower shaft speed	RPM
1.6	Brake shaft power	HP
1.7	Motor Rating	HP/ RPM
1.8	LCD Panel with remote	Required/Not required

5.0 ATTACHMENTS:

1. Instruction to vendor for site performance guarantee requirements for package units (7-76- 0103 rev 1)
2. Standard Specification for Erection of Equipment and Machinery (6-76-0001 Rev. 2)

**SCOPE OF WORK AND SUPPLY
FOR
COMPOSITE WORKS FOR RAILWAY SIDING
OF BCPL, LEPETKATA
(ELECTRICAL WORKS)**

A	28.07.2014	ISSUED FOR TENDER	PM	ST	ST
Rev. No	Date	Purpose	Prepared by	Checked by	Approved by

1.0 SCOPE OF WORK & SUPPLY

The intent of this specification is to outline the purchaser's requirement for Electricals for AC System for Control room and UPS room of Lepetkata Railway siding facilities for Naptha unloading.

1.1 STANDARDS

1.1.1 The work shall be performed in conformity with these specifications, standard specifications, installation standards enclosed as per list of attachments and Codes of Practice specified or referred.

1.1.2 In addition, works shall also conform to the requirements of latest editions / amendments of the followings as applicable:

1. The Indian Electricity Act and Rules framed there under
2. Fire insurance regulations
3. Regulations laid down by the CEA
4. Regulations laid down by the Factory Inspectorate
5. Applicable Codes of Practice of the BIS
6. Any other regulations laid down by the Central, State or Local Authorities from time to time.

1.2 GUARANTEE

1.2.1 The CONTRACTOR shall guarantee the installation against any defects of workmanship and materials (supplied by the CONTRACTOR) for a period as mentioned in the commercial part of this tender. Any damage or defects connected with the installation of material(s) supplied by the contractor that may be undiscovered at the time of issue of completion certificate or may arise or come to light thereafter, shall be rectified or replaced by the CONTRACTOR at his own expense as deemed necessary and as per instructions of Engineer-in-Charge/Owner/EIL, within specified time limit.

1.2.2 The above guarantee shall be applicable for the quality of the work executed as well as for all equipment / materials supplied by the contractor.

1.3 SITE CONDITIONS

The equipment and the installation shall be suitable for continuous operation under the following site conditions:

Maximum Ambient Temperature	:	39.8°C
Minimum Ambient Temperature	:	1°C
Design Temperature	:	40°C
Max. Relative Humidity	:	93%
Altitude (MSL)	:	Less than 1000 m above
Climate Condition	:	Moderate
Location	:	Lepetkata, Assam

1.4 UTILIZATION VOLTAGES

Input for AC Lighting / Power Panel	:	415 V AC TPN $\pm$ 10%
Power supply for split / cassette type ACs	:	240 V AC SPN $\pm$ 10%

2.0 SCOPE OF WORK

The scope of this tender includes but is not limited to the following. The scope also includes handling, transportation of equipment/ material from owner's stores/ warehouse to the place of installation and supply of commissioning spares wherever required. Detailed scope of works and quantities shall be as per Schedule of Rates (SOR) enclosed with the tender.

2.1 Supply, Installation, Testing and Commissioning

- 2.1.1 Safe area power panel for air conditioning system for control room / UPS room building.
- 2.1.2 Black enameled steel conduits for surface wiring for Air Conditioning power & earthing wires.
- 2.1.3 GI pull boxes and pull wires.
- 2.1.4 1.1kV grade 1.5/6.0 sq.mm. Copper wires for surface wiring through black enameled conduit.
- 2.1.5 All other hardware like nuts, bolts, washers, spring washers, grouting bolts, clamps, supports etc. necessary for completion of job.
- 2.1.6 Miscellaneous material like sand, bricks, plain cement concrete, bitumen etc. as required for minor civil works.
- 2.1.7 Any other material (not covered under EIL / Owner's supply) though not specifically mentioned above but required for completion of the work as per specifications, drawings and instruction of Engineer-in-charge.
- 2.1.8 DP MCB unit in moulded case enclosure for starting of air conditioning system.

2.2 WORKS EXCLUDED

- 2.2.1 Supply. Laying & termination of incoming cabling for power panels.

Note:

Quantities given in the SOR are tentative. Contractor shall take owner's approval before ordering.

- 3.0 Makes of electrical materials/ components shall be selected out of the list given in this specification. All electrical equipment shall be brand new with state of art technology and proven track record. No prototype shall be offered. The make and type of equipment, if not specified in this tender shall be subject to OWNER / EIL approval.

4.0 APPROVED MAKES OF MATERIALS/ COMPONENTS

- 4.1 Contractor shall restrict the makes of materials/ components supplied by him to the following:

Power panel	Control & Switchgear, ABB, Novateur, Havell's
MCBs	Havell's, ABB, C&S, Noveteur, Siemens Standard Electricals, Indiana, Legrand

Contractor may procure materials from any of Owner/ EIL approved vendors. However, current validity and range of approval as per EIL enlistment letter, workload, stability and solvency need to be verified by the contractor before placement of order.

- 4.2 Contractor can offer components of makes other than specified in the Tender during order execution. The alternate make of components will be evaluated post order, based on the satisfactory track record to be furnished by the contractor. In case the alternate makes are not found acceptable, components shall be supplied strictly as per above vendor list.

5.0 LIST OF ATTACHMENTS

SL.	TITLE	DOCUMENT NO.	REV.	PAGES
1.	Scope Division	ANNEXURE-I	A	1
2.	Specification for Electrical equipment installation	6-51-0081	4	15
3.	Specification for field testing and commissioning of electrical equipment	6-51-0087	3	8
4.	Typical installation of lighting / power panel wall (surface) mounted	7-51-0226	4	1
5.	Installation details for conduit or cable support on wall/slab/beam.	7-51-0305	4	1
6.	Installation details for socket/receptacle mounted on wall/column	7-51-0315	4	1