

Bharat Heavy Electricals Limited
Ramachandrapuram : : Hyderabad – 502032
M&S – DIVISION
SCOPE OF WORK

Tender No.: M&S/P&S/2021/63, Dt.: 13.11.2021

Name of Work: Operation and Maintenance of 2X20 Ton capacity LPG establishment; and Daily Maintenance and Repair of LPG operated equipment w.r.t gas leakages installed in different shops of BHEL, R.C.Puram for a period of two years.

ANNEXURE-I (LPG PLANT AMC SCOPE):

S.No.	Description	Vendor's Acceptance
A	PURPOSE: Annual contract for Operation and Maintenance of LPG/PROPANE installation at LPG/PROPANE Yard & Distribution pipeline of BHEL, R.C. Puram. AMC is based on yearly basis but valid for two years.	
B	Scope of work: To Operate & maintenance of the LPG/Propane installation & Distribution system from LPG storage area to required production shops i.e from the bullets to the entry (main supply ball valve) of the various user points at BHEL, R.C.PURAM for two years maintenance. O&M of the yard as per Rules/PESO(CCOE) requirement.	
1.	OPERATIONAL FUNCTIONS: The following aspects shall be covered.	
1.1	Supply of LPG/PROPANE gas to the various users from the stock of LPG/PROPANE installation for 24 hours (round the clock), all 365 days.	
1.2	Safety of operation: The following Safety precautions shall be taken: 1. All safety precautions are required as per SMPV(U) Rules. 2. No Hazardous materials shall be used during the operation & maintenance. 3. Safety gadgets shall be used during the operation. 4.The operators shall be trained and shall undergo refresher training at least once in a year.	
1.3	To check & record stock of LPG/PROPANE every day morning, at a fixed time.	
1.4	Controlling, Checking & recording of line vapor pressure on hourly basis.	

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1.5	Maintaining the required LPG/PROPANE pressure by operating suitable vaporizers.	
1.6	Checking & recording of pressure & temperature of the tanks and as well as Vaporizers on hourly basis and record the same.	
1.7	Water sprinkler system is to be kept under operating condition and to be operated whenever required.	
1.8	Ensuring the smooth LPG supply and attending any malfunctioning of vaporizers.	
1.9	While unloading the LPG/PROPANE from outside Tankers, Recording the initial & final stock readings of the LPG/PROPANE tankers & to ensure entire LPG/PROPANE quantity is transferred in our bullets.	
1.10	Decanting of LPG/PROPANE tankers as per the safety norms & checking with soap solution for leakage & also with explosive meter while decanting process.	
1.11	To ensure that the tanker is completely emptied while decanting before the departure of the tankers, and to obtain confirmation with MPL (Plant Maintenance) & PUR (Purchase) personnel.	
1.12	Scope of the contract is operation & maintenance of LPG/PROPANE storage tanks and its accessories, supply from the bullet up to the entry of the various users.	
2.	MECHANICAL	
2.1	Periodical maintenance / cleaning of valves & replacement of the same if necessary.	
2.2	Changing Valve Gaskets.	
2.3	Replacement of any mechanical parts/spares if necessary of Water pumps.	
2.4	Periodical maintenance / cleaning of LPG decanting & water recirculation pumps.	
2.5	Periodical cleaning of Vaporizers.	
2.6	Periodical maintenance / cleaning of Pressure regulators. Liquid traps & Strainers on LPG/PROPANE - liquid, vapor & water lines.	
2.7	Maintenance of water sprinkler system & Fire hydrant system & its water pumps.	
2.8	Periodical maintenance of ambient water recirculation of Vaporizers.	
2.9	Periodical checking, functioning of LPG/PROPANE leak detectors.	
2.10	Replacement of sensors of LPG/PROPANE leak detectors.	
3.	ELECTRICAL	
3.1	Maintenance of all electrical equipment	
3.2	Replacement of relays lamps etc. in the control panel in good working conditioning.	

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3.3	Periodical checking of the ROV Function & Terminals of Solenoid valves.	
3.4	Checking of limit switches of different ROV's.	
3.5	Periodical servicing of solenoids valves of vaporizers & ROV's	
3.6	Cam adjustment of different ROV's for proper indication, on control panel.	
3.7	Replacement of Indication lamps, bulbs, switches, fuses etc. in the Control panel.	
3.8	Weekly checking of all " Auto Controls & Displays " on display panel in control room.	
3.9	Maintenance of the Control Panel installed in Control Room.	
4.	MISCELLANEOUS, HOUSEKEEPING, RECORD TO BE MAINTAINED	
4.1	Daily Log Books should be maintained for the operation of pumps & vaporizer in the formats approved by BHEL. A monthly -summarized report Indicating salient points to be submitted.	
4.2	Daily log book should be maintained to note down the shift wise activities.	
4.3	Preventive maintenance schedules other than above mentioned if found necessary or as per the requirement of BHEL.	
4.4	Monthly work schedule & Monthly narrative report to be submitted to BHEL every month.	
4.5	Party has to ensure the cleanliness of the equipment's and its surroundings of the pump house, storage water tank and inside the yard including tanks .	
4.6	Painting of different display boards related to LPG/PROPANE installation (Consumables like paint, brush, thinner will be provided by BHEL)	
4.7	Party's staff should be trained and have adequate knowledge to Act on emergencies. In addition, to handle CO2/DCP Fire Extinguishers & Fire Monitors.	
4.8	Periodical painting of the equipment's viz. Vaporizers, Pumps, Water circulation Pumps Flow meter etc. should be carried out (Consumables like paint, brush, thinner will be provided by BHEL)	
5.	ROUTINE CHECKS & RECORD KEEPING HOURLY ROUTINE CHECK UP	
5.1	Tank Pressure.	
5.2	Tank Temperature.	
5.3	Pressure before regulator & after regulator	
5.4	Liquid line pressure.	

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5.5	Flow rate of vapor	
5.6	vapor temperature	
5.7	Water pressure	
5.8	Hydrant line pressure	
5.9	Compressed Air Pressure	
5.10	Ambient Temperature	
6.	DAILY CHECK UP	
6.1	To check the operation of ROV's for LPG/PROPANE Installation.	
6.2	To check with Explosion Meter for leakage inside yard, if any rectify it.	
6.3	To check the stock level in the bullets.	
6.4	To check the water level in water storage tank.	
6.5	Water level in vaporizers.	
7.	PREVENTIVE MAINTENANCE SCHEDULE: FORTNIGHTLY MAINTENANCE	
7.1	To drain the moisture from storage tanks	
7.2	Execute liquid if any from the liquid traps	
7.3	To check the setting of Thermostats	
7.4	To check the setting of Pressure Regulators	
7.5	To Check the setting of flushing valve	
7.6	To check the Tension of 'V' Belts of pumps & compressor.	
7.7	To check the tightness of Pulleys of pumps	
7.8	To check the tightness of Pulleys of compressor.	
7.9	To check the condition of Vaporizers	
7.10	Changeover of water recirculation pump & strainer servicing.	
7.11	To check the operation of sprinklers & fire Hydrants & blockage of Nozzles	
7.12	To check & rectify for leakage of the joints on tanks i) Inlet, ii) Outlet, iii) Manhole cover & iv) Safety Valve.	
7.13	To check the function of pressure regulators.	

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7.14	Cleaning of the filter/strainer in the vapor eliminator of LPG/PROPANE Dispenser.	
7.15	Checking Temperature setting of the LPG vaporizer	
7.16	Checking the present function of the LPG Vaporizer	
7.17	Checking the low flow rate cut out of the vaporizer.	
7.18	Checking level Monitoring system alarms.	
7.19	Leak test of all the hydraulic joints of the LPG Vaporizer and the total piping system.	
7.20	Visual checking of the LPG piping both above ground and in trenches.	
7.21	Pneumatic Circuit airline to be checked for any kinks/leaks etc.	
7.22	Function of the ROV's and lubricating of the actuators.	
7.23	Condition of the electrical cables.	
7.24	Checking of the condition of the pressure relief valve, temperature relief valves provided on the LPG tank and piping.	
8.	PREVENTIVE MAINTENANCE SCHEDULE: MONTHLY MAINTENANCE	
8.1	To check the function off Flushing valve.	
8.2	To check the functioning of pressure gauges.	
8.3	To check the entire ball valves	
8.4	To check all the liquid lines from Tank to vaporizers & Tank to Decanting area.	
8.5	To check all the earthing joints & jumpers on liquid & vapor lines.	
8.6	To check the foundation bolts of pumps.	
8.7	To check the earthing resistance & record should be maintained (To maintain earth resistance below 0.5-ohm necessary watering shall be done.)	
8.8	Check the safety Measures at Yard & Control Room.	
8.9	Control Panel in Control Room Operation & Maintenance Monthly report to be made & signed by BHEL.	
9.	PREVENTIVE MAINTENANCE SCHEDULE: QUARTERLY MAINTENANCE	
9.1	To provide labor assistance for Testing and calibration of Safety valves, GLD's & Hoses. Checking of earth pits is in the scope of vendor.	
9.2	To provide labor assistance in Checking ,Setting & Calibration of Pressure Switches, Pressure gauges, Temperature Switches & Temperature gauges.	

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9.3	Overhauling of vaporizers & pumps. (period may be decided based on condition.)	
10.	ATTENDING THE BREAK DOWN / REPAIRS	
10.1	All equipment's in the yard and LPG / PROPANE distribution system to be maintained and repaired by the vendor. The tools and testers required are in the scope of vendor.	
10.2	Operation and Maintenance contract comprises of following equipment and with its accessories of LPG/PROPANE yard & LPG/PROPANE Distribution system.	
10.3	LPG/PROPANE Storage Tanks. 2nos with its accessories.	
10.4	LPG/PROPANE Unloading Vapor recovery Compressor and its accessories.	
10.5	LPG/PROPANE Unloading Decanting pumps.	
10.6	All Vaporizers	
10.7	Water recirculation pumps, Electrical, Diesel pump and jack pump.	
10.8	flushing valves	
10.9	fire hydrant pump	
10.10	Regulators	
10.11	ROV's	
10.12	NRV's	
10.13	Solenoid Valve	
10.14	water flow indicators	
10.15	Safety Valves	
10.16	Pressure Switches	
10.17	Thermostats	
10.18	Flow meters	
10.19	Ball Valves	
10.20	ROV'S with Ball Valves	
10.21	Fixed Level Gauges	
10.22	Roto Gauges	
10.23	Safety Valves	

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10.24	Sprinkler Nozzles	
10.25	Excess flow valves	
10.26	Gauges	
10.27	Strainers	
10.28	Belts	

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ANNEXURE-II (LPG EQUIPMENT SCOPE):

S.No.	Description	Vendor's Acceptance
A	PURPOSE: Daily maintenance and repair of LP gas operated equipment's (furnaces, ovens, ladles, centrifugal die preheaters, heating torches, Boilers and down comers) installed in all shops of BHEL, RCPURAM with respect to gas leakages. List of Equipment's is given in Annexure 'A'. Maintenance Contract is for Two years from the date of award.	
B	SCOPE OF WORK: To repair and maintain GAS Leakages in all LP Gas operated equipment in safe working condition includes replacement of listed spares in all production shops at BHEL, R.C. Puram. The LPG line and its spares starts from main supply line ball valve to the burners and airline including blower to the burners if installed in the equipment.	
1.	MECHANICAL AND ELECTRICAL: Arresting of gas leaks by changing gaskets, welding and threaded joints with Teflon tape or Anabond.	
2.	ATTENDING THE GAS LEAKS / REPAIRS	
2.1	All LP Gas operated equipment from main supply line ball valve to the burners installed in the equipment are to be maintained and repaired by the vendor. The parts/items installed in the equipment gas line are listed below:	
2.2	PRESSURE GAUGE	
2.3	GAS PRESURE SWITCHES	
2.4	SOLINOID VALVES	
2.5	PRESSURE RELIEF VALVES	
2.6	NEEEDLE VALVES	
2.7	MODULATING MOTORS	
2.8	UV FLAME SENSORS AND FLAME RELAYS	
2.9	BALL VALVES	
2.10	THERMO COUPLES	
2.11	GAS FILTERS	
2.12	PILOT BURNERS	

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2.13	FLEXIBLE JOINTS	
2.14	SLAM SHUT OFF VALVES	
2.15	DIFFERENTIAL PRESSURE TRANSMITTERS AND PRESSURE TRENSMITTERS	
2.16	PRESSURE REGULATING VALVES	
2.17	BUTTERFLY VALVES	
2.18	COMPLETE SET OF BURNER ASSEMBLIES	
2.19	MOT. CONTROL VALVES	
2.20	CPI SWITCHES	
2.21	IGNITION TRANSFORMERS AND SPARK PLUGS	
2.22	FLEXIBLE BELLOWS	
2.23	BLOWERS,MOTOR WITH FILTER AND DAMPER	
2.24	FLAME SWITCHES	
2.25	NON RETURN VALVES	
2.26	AIR RATIO REGULATION VALVES	
2.27	ELECTRIC ACTUATORS	
2.28	DIFFERENT SIZES OF FITTINGS AND CONNECTORS.	
2.29	LPG HOSES	
2.30	BALL VALVES	
2.31	FLASH BACK ARRESTORS	
2.32	GAS LEAK DETECTORS AND MONITORING SYSTEM	
2.33	BURNER SEQUENCE CONTROLLERS	
3.	CONSUMABLES: All consumables and spares which are required for repair & maintenance is in the scope of BHEL and will be provided by shop M&S.	
4.	Vendor scope: Vendor should bring his own serviceable and calibrated portable gas leak detector, welding M/C, tools and testers for carrying the work.	
5.	ROUTINE CHECKS & RECORD KEEPING: Proper monthly repair and maintenance record to be maintained by the vendor.	

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ANNEXURE – III (OTHER TERMS AND CONDITIONS)

S.No.	Description	Vendor's Acceptance
1.	CONSUMABLES, TOOLS AND TESTERS	
1.1	Spares and consumables which required for operation & maintenance shall be in the scope of BHEL.	
1.2	The tools and testers required for Operation and Maintenance of LPG/PROPANE Installation at LPG/PROPANE Yard & Distribution pipe line are in the scope of vendor.	
2.	STATUTORY OBLIGATIONS: The vendor should assist in clearing statutory obligations raised by various agencies for the safety of the establishment.	
3.	SAFETY	
3.1	All safety precautions to be taken care by the contractor as per standard rules.	
3.2	The rules of PESO(CCOE), Factories Inspectorate and recommendation of TRMS & Company safety rules would be the guiding factors for ensuring the safety.	
3.3	In charge should be available at site during the visit of inspections/Auditors.	
4.	MANPOWER:	
4.1	A - Shift, Two persons (1SW, 1USW)	
4.2	B - Shift, Two persons (1SW, 1USW)	
4.3	C - Shift, Two persons (1SW, 1USW)	
4.4	Supervisor/Reliever - 1 SW	
4.5	The staff and operators at LPG/PROPANE yard /control room should have knowledge and background about LPG/PROPANE handling, maintenance and safety aspects. Knowledge about Firefighting is also essential.	
4.6	Agency shall engage sufficient qualified supervisor with minimum qualification of Diploma in Mechanical/Electrical and workers with ITI qualification in Fitter, /Instrumentation/welding trade to carry out work on daily basis. The persons should have experience in maintaining LP Gas operated industrial equipment.	
5.	Penalty: If the agency fails to engage staff as per the scope and unable to run the LPG/Propane Yard as per the requirement intimated by in charge a penalty of Rs. 5000.00 per shift will be imposed.	

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5.1	In addition to the above, any penalties levied by statutory authorities of the deficient operation & maintenance of LPG yard and distribution pipelines during the inspection, the same amount will be recovered from the Agency.	
6.	TRAINING	
6.1	Periodic training should be given to all the operating and maintenance staff on following aspects.	
6.2	Operation of ROV's	
6.3	Operation of sprinkler system Mock Trail.	
6.4	Mock Drills.	
6.5	Decanting process & records.	
6.6	Disaster control plan	
6.7	Safety while handling liquid LPG/PROPANE.	

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ANNEXURE – IV (LPG EQUIPMENT IN ALL BUILDINGS)

04 BLOCK

S.NO.	TYPE OF EQUIPMENT	No of Burners	QTY
1	LP LADDLE PREHEATER	1 no for Each furnace	2
2	BP LADDLE PREHEATER	1 no for Each furnace	2
3	5 M/TON -OVEN	1 no for Each furnace	2
4	30 M/TON MOULD DRYING OVEN	2 Nos with Pilot Burner	1
5	75 M/TON MOULD DRYING OVEN	2 Nos with Pilot Burner	1
6	CENTRIFUGAL DIE PREHEATING BURNERS	1 no for Each furnace	6

05 BLOCK

S.NO.	TYPE OF EQUIPMENT	No of Burners	QTY
1	30 M/TON ANNEALING FURNACE	24 Nos	1
2	2 M/TON MOULD DRYING OVEN	2 Nos	1
3	ALUMINIUM MELTING FURNACE	2 Nos	1

08 BLOCK

S.NO.	TYPE OF FURNACE	No of Burners	QTY
1	0.5 M/TON FORGE FURNACE	2 nos for Each furnace	2

06 BLOCK

S.NO.	TYPE OF FURNACE	No of Burners	QTY
1	60 M/TON BOGIE FURNACE	36 Nos	1
2	5 M/TON RING HEATING FURNACE	2 nos for Each furnace	2

02 BLOCK

S.NO.	TYPE OF FURNACE	No of Burners	QTY
1	150 M/TON OVEN	2 Nos with Pilot Burner	1
2	4 TPH BOILER	1 No with Pilot Burner	1

BOILER HOUSE

S.NO.	TYPE OF BOILER	No of Burners	QTY
1	30 TPH LPG FIRED BOILER	1 No with Pilot Burner	1

ALL BLOCKS

S.NO.	TYPE OF EQUIPMENT	QTY
1	DOWNCOMERS	77

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