Bharat Heavy Electricals Limited
ELECTRONICS DIVISION
Mysore Road, Bangalore – 560026 Ph.080-26998991
SC&PV – PV-Eng- DEPT.

NOTICE INVITING TENDERS

1	TENDER NUMBER(RFQ)	:	EDN: PVENG:NTPC FSPV : 100MW: BOS1 Dt: 04.02.2020
2	NAME OF WORK	:	SCOPE OF WORK CUM TECHNICAL SPECIFICATION (BOS1) for 100MW – AC (145.5MW –DC) Floating Solar Photovoltaic Grid-connected Power plant for NTPC at Ramagundam, Telangana (All listed works shall be Undertaken and executed)
3	ESTIMATED COST	:	**Rs.26.10 Crore (Approx. for 100MW-AC (145.5MW-DC) Floating solar) Plus applicable GST.**
4	EARNEST MONEY DEPOSIT	:	**Rs.25.66 Lakhs (Mandatory for MSME also)** **(a) Bidders can submit Rs.25.66 Lakhs EMD through DD/SBI Collect (Please refer point no.: 21 of "Instructions to tenderer" for guideline for payment through SBI Collect)** **(b) Alternatively bidders can submit Rs.20.0 Lakhs EMD through DD/SBI collect and balance Rs.5.66 Lakhs in the form of Bank Guarantee from the scheduled bank.**
5	SECURITY DEPOSIT	:	50% of SD shall be submitted before start of work; Balance will be recovered from running Bills at a rate of 10%. (SD= 5% of the work order amount); 50% of SD will be released after completion of all the works and remaining 50% after 6 months from the date of completion of all the works.
6	COMPLETION TIME	:	05 Months in case the order is split in L1 and L2 and in event of L1 executing the entire scope of works, his completion period will be (6) six months. (From the date of placement of Order/handing over of the site.)
7	LAST DATE AND TIME FOR THE SUBMISSION OF DULY FILLED IN TENDER DOCUMENT	:	14.02.2020 Before 01:00 P.M
8	PLACE OF SUBMISSION OF TENDER DOCUMENT	:	Shri. Sreenath M, AGM (SC&PV-PCG,M) 5th Floor, New Engineering Building, BHEL- Electronics Division Mysore Road, Bangalore -560 026.
9	ADDRESS TO BE SUPERSCRIBED ON TENDER ENVELOPE	:	Shr. Sreenath M, AGM (SC&PV-PCG,M) 5th Floor, New Engineering Building, BHEL- Electronics Division Mysore Road, Bangalore -560 026.
10	DATE AND TIME OF TECHNICAL BID OPENING	:	14.02.2020 –(01:30 P.M)
11	TENDER MONITORING AUTHORITY (IEM)	:	Mr. Arun Chandra Verma, IPS (Retd.)

NIT Issued By
PUNAM MISHRA,
Sr. Manager- SC & PV - ENGG.

CONTRACTOR (SIGN & SEAL)

NOTE: The tenderer shall return the dully filled in tender document after affixing signature and seal on all pages and submit.

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Sr. Manager- SC & PV - ENGG.

CONTRACTOR (SIGN & SEAL)

Bharat Heavy Electricals Ltd
Electronics Division
Mysore Road, Bangalore – 560026

Tender Document for

SCOPE OF WORK CUM TECHNICAL SPECIFICATION (BOS1) for 100MW-AC (145.5MW DC) Floating Solar

Photovoltaic Grid-connected Power plant for NTPC at Ramagundam, Telangana

TENDER NUMBER RFQ: EDN: PVENG: NTPC FSPV : 100MW-AC (145.5MW-DC): BOS1

TECHNICAL BID DATE OF OPENING: 14-02-2020 (Price bid opening date intimation will be given separately)

Part – I Technical cum Commercial Bid

Unpriced Price Bid

Technical and General Specification

BHEL General Conditions of Contract 2019 **(Please note that wherever state Karnataka is mentioned in GCC it has to be read as Telangana).**

Tentative Field Quality Plan

Integrity Pact

Annexure to Integrity Pact

Bank Guarantee format for EMD

Tentative tender drawing

Part – II Price Bid

Note:

1. Part – I: To be submitted in a separate sealed cover.
2. Part – II: To be submitted in a separate sealed cover.
3. Earnest Money Deposit of Rupees 25.66 Lakhs shall be submitted as per point No. 4 of page No. 1 of this tender document.
4. Tenders will be liable for rejection if the above mentioned EMD is not submitted along with the tender.
5. Part-I, Part-II and Tender EMD sealed covers should be put in an outer envelope and super scribing the Name of work and Name & Address of the Tenderer.

NIT Issued By
PUNAM MISHRA,
Sr. Manager- SC & PV - ENGG.

CONTRACTOR (SIGN & SEAL)

BHARAT HEAVY ELECTRICALS LTD, ELECTRONICS DIVISION, BANGALORE-26

TENDER NUMBER RFQ: EDN: PVENG: NTPC FSPV : 100MW: BOS1; Dt.: 18.11.2019

PART-I TECHNICAL-CUM-COMMERCIAL BID

(To be furnished by the Bidders)

01. NAME OF THE WORK : SCOPE OF WORK CUM TECHNICAL SPECIFICATION (BOS1) for 100MW-AC (145.5MW-DC) Floating Solar Photovoltaic Grid-connected Power plant for NTPC at Ramagundam Telangana

(All listed works shall be Undertaken and executed)

02. APPROXIMATE ESTT.COST RS. : Rs.26.10Crore (APPROX.) plus applicable GST.

03. COMPLETION PERIOD : 05 Months in case the order is split in L1 and L2 and in event of L1 executing the entire scope of works, his completion period will be (6) six months. . (From the date of placement of Order/handing over of the site).

04. NAME OF THE CONTRACTOR :

05. ADDRESS

(A) OFFICE :

E-mail :

TEL. PH. NO. :

(B)RESIDENCE :

TEL.PH NO :

06. PAN NO :

07. GST NO :

08. STAFF STRENGTH :

09. PLANT/EQUIPMENTS : List enclosed/not enclosed

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CONTRACTOR (SIGN & SEAL)

10. a) SCOPE OF WORK : UNDERSTOOD/ NOT UNDERSTOOD
(As per schedule of items)
b) Accept to execute in total : YES/ NO

c) Bar chart be submitted : YES/ NO
Individually for each work for L1 Scope.

e) In order to complete the project in the specified months schedule, vendor to deploy separate Four gangs/teams (or) more as per site requirement for each individual activities along with tools and machineries, Undertaking should be submitted along with offer : YES/ NO

11. a) EMD PARTICULARS (DEMAND DRAFT/ SBI COLLECT REF NO. / BG DETAIL) :

b) Electronic Funds Transfer (EFT) form enclosed : Please fill up the form in ANNEXURE-II

12. Penalty as per BHEL General conditions of contract 2019 clause No. 2.7.9 : Accepted / Not accepted

13. Constitution of Firm : Individual / Sole Proprietorship Concern / Partnership Firm / Public Ltd. Company/ Private Ltd. Company.

14. BHEL reserves right to conduct reverse auction : Accepted / Not accepted

15. Accept to pay statutory payments like ESI, PF, BOCW, etc., as per terms and conditions of BHEL and Govt. guideline's : Accepted / Not accepted

Note:

1. Bidders are advised to quote their best prices (% above/below the total estimate +/_ (or) at par) as no further price bids will be accepted in case BHEL decides to open price bids instead of reverse auction.

2. Reverse auction seal bid opening price should not be more than the manual quoted (hand written) price bid.

3. In order to complete the works as per schedule and to execute specific specialized works awarded to the contractor, he may subject to approval of BHEL engage other agency having qualifications and experience to carry out the particular work under direct supervision and quality control of the contractor.

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CONTRACTOR (SIGN & SEAL)

PRE QUALIFICATION CRITERIA

(I) Bidders should have executed works of similar nature of works during last ten years as per below, as on the date of opening of Technical Bid.

One similar work of value not less than 5 crores. (excluding all taxes).

OR

Two similar works of value each not less than 3 crores (excluding all taxes)

OR

Three similar works of value each not less than 2 crores (excluding all taxes)

Note: List of similar works shall be as follows:

(i) Bidder should have successfully executed work order for execution of Land mounted or Roof top Solar plants for 10 MW or above.

Or

Bidder should have successfully executed work order for execution of Floating Solar plants for 100kw or above.

Or

Bidder should have work experience in field of reservoir/lake/river water activity or any water works such as dredging /silt removal/construction /cable or pipe laying.

The term 'executed' means the bidder should have achieved the criteria specified above even if the total contract has not been completed or closed. For above (evidence in the form of tax invoice or delivery challans or work completion certification or relevant documents to be furnished.)

(ii) Average annual financial turn over during the last 3 years, ending 31st March of the previous financial year, should be 30% of the maximum quantum of work envisaged on one contractor i.e Rs 4.69 crs. Audited Profit & loss account and balance sheet to be submitted for FY 2016-17, 2017-18 and 2018-19. CA certificate for Turnover to be submitted along with Balance Sheet.

Note: Offers of the Tenderers not meeting the above requirements are liable to be rejected.

Documents required to be submitted

1. Registration Certificate with ESI and PF Authority/Declaration.
2. Income Tax Returns for last Three years
3. Balance Sheet and Profit & Loss Account for the last 03 years by auditor.
4. Availability of Technical personnel in letter head.
5. List of equipment to be mobilized at site.
6. GST Registration details or Declaration.
7. Regsitration with BHEL/CPWD/other Government Organizations/PSUs if any
8. Declaration for full filing the BOCW requirements

All the supporting documents to be signed and sealed by the bidder (BHEL have the rights to verify the original documents if required)

BIDDER TO NOTE FOR COMPLIANCE:

Techno Commercial bid to be filled by the bidder.

S.no	Description	Confirmation	Remarks
1	Machineries to be deployed	YES/NO	List to be furnished.
2	BHEL Payment terms acceptance (Cl. no. 21, 22.1 & 22.2 of Special Conditions of Contract)	YES/NO	
3	BHEL reserves right to conduct reverse auction. Indicate acceptance.	YES/NO	
4	The bidder should encourage to use local labor that has the necessary skills as per the requirement of work.	YES/NO	
5	Signed unpriced copy of price bid format attached along with the techno commercial bid.	YES/NO	Bidder to sign and seal and give the concurrence of understanding the unpriced price bid. Bidder should not write anything other than his sign and seal on the Unpriced price bid.This unpriced bid to be submitted with the techno-commercial bid.

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6	Before engaging the labour in to work, Contractor should get the NOC from labours' native police station as well as NOC from local police station (If applicable). Contractor is required to comply with NTPC's CLIMS system for identification and movement of labour in their work site.	YES/NO	

NOTE:

1) In view of large quantum of work and restricted period for completion of project and project location, proposed to split the contract/scope of work in two parts as per site requirement and as per sl. no. 2 below.
2) It is proposed to award the work to,

(a) L1 and L2 bidder with 60%, and 40% of total scope of work, in such case L2 bidder has to match the price of L1 bidder.
(b) In case of denial of the same by L2, it shall be offered subsequently to all other bidders till we get one vendor to accept L1 prices and then scope of work shall allotted as mentioned.
(c) However in case no bidder agrees to match L1 price , then L1 bidder is bound to execute total scope of work.
(d) In any case, BHEL reserves the right to change the splitting the scope of work (or) re-float the tender.

INFORMATION TO THE TENDERER:

(i) Successful Bidder should establish their Site office at Construction site, including common facilities such as toilet, water, electricity etc. in consultation with BHEL. Contractor has to arrange water and power as required for completing the job in the stipulated time frame at their own cost.

(ii) The bidders should furnish "Site Inspection Certificate" in Annexure-III enclosed herewith.

(iii) Bidders should study the prevailing Market trend of Electrical materials/laborers/other relevant requirement before quote and submit the competitive price.

(iv) The bidder should encourage to use local labor that has the necessary skills as per the requirement of work.

(v) Before engaging the labour in to work, Contractor should get the NOC from labours' native police station as well as NOC from local police station (If applicable).

(vi) The bidders should carry out preliminary survey at proposed construction site before submission of offer to ensure that the rate quoted for the relevant schedule of items are correct.

(vii) Contractor to note BHEL reserves the right to get any part of the work done through other agency or deploy BHEL's own/hired/otherwise arranged resources, at the risk and cost of the contractor after due notice of a period of two weeks by BHEL, in the event of:-

a) Contractors continued poor progress
b) Withdrawal from or abandonment of the work before completion of the work.
c) Contractor's inability to progress the work for completion as stipulated in the contract
d) Poor quality of work
e) Corrupt act of Contractor
f) Insolvency of the contractor
g) Persistent disregard to the instructions of BHEL
h) Assignment, transfer, sub-letting of contract without BHEL's written permission
i) Non fulfillment of any contractual obligations
j) In the opinion of BHEL, the contractor is overloaded and is not in a position to execute job as per required schedule.

(viii) The liquidated damages/penalties arising out of Risk and Cost as explained under Sl.no (vii). BHEL shall recover the amount from any money due from Contractor, or from any money due to the contractor including security deposit, or by forfeiting any T & P or material of the contractor under this contract or any other contract of BHEL or by any other means or any combination thereof.

(vii) **Documents to be submitted on award of work (as applicable):**

a) Security deposit in the form of Cash/DD/ NSC's / Kisan Vikas Patra / FDR / Bank Guarantee in favour of BHEL

(b)Electronic Fund Transfer Form duly signed & sealed by banker along with cancelled cheque copy

(c) Labour license of the workmen engaged valid for contract period (If applicable)

(d) Electrician qualification certificate(minimum ITI certificate/B license) for electrical work.

(d) Workmen Compensation Insurance Policy for the workmen engaged valid for contract period

(e) Deduction of statutory taxes (as applicable) at source would be enforced from the running bills at the rates prescribed unless exemption certificate is produced from the concerned authorities.

The following documents are to be submitted along with the Running Account Bills for process of payment

a) Tax Invoice with details of GST number of BHEL and contractor.
b) Measurement books duly filled and signed by officials of BHEL and contractor
c) Provident PF Remittance challan for the bill duration.
d) ESI Remittance challan for the bill duration.

e) Invoice submitted along with running bills to indicate the GST amount charged and bear GST NUMBER etc. as per prevailing taxes.

Bill submitted subsequently to be accompanied with a declaration that GST liability on the earlier bill has been discharged.

i) by paying money to the Government (along with Tax paid Challan Copy)

ii) by utilization of Input GST Credit

f) Field quality assurance documents (as applicable) as per instruction of Engineer In-charge.

Mobilization at site:

1) Requisite Material (SCB support structure, earthing wire, HDPE Pipe, MC4 & Y connectors etc.,), men (electrician,welders, deep diving person, etc.,) and machinery (All tools ,tackles and Infrastructure like boats ,welding machine ,drilling machine, etc.) should be arranged in order to complete the project within stipulated time period.
2) The contractor shall carry the work as per the approved PV array layout issued by BHEL (Tentative Field quality plan enclosed with this tender for reference)

Bharat Heavy Electricals Limited
ELECTRONICS DIVISION
MYSORE ROAD- BANGALORE-26
INSTRUCTIONS TO TENDERER

1. Sealed Tender for the above noted work is hereby invited from bidder experienced in similar works like BOS work activity of minimum 10MW land/roof mounted solar plant or 100kw floating solar plant or work experience in field of reservoir/lake/river water activity or any water works such as dredging /silt removal/construction /cable or pipe laying.
2. Scope of work for 100MW: erection and commissioning work (BOS1) for 100MW –AC(145.5MW-DC) Floating Solar Photovoltaic Grid-connected Power plant for NTPC at Ramagundam, Telangana .Detail scope of work is attached along with tender. However depending on site conditions minor modification in works may be necessary.

3. Project detail and Location:

Site Detail	**Project detail**	**Location**
NTPC Ramagundam	100MWp-AC-(145.5MW –DC) floating solar	100 MW –AC-(145.5MW-DC) Floating Solar PV Project, NTPC Ramagundam, Peddapelli District, Telangana - 505215

4. **Tenders should be addressed to: Shri. Sreenath M, AGM (SC&PV-PCG,M) , NEB 5th Floor, Electronics Division, Bharat Heavy Electricals Limited, Mysore road, Bangalore – 560 026. In three separate sealed cover for "Technical cum Commercial Bid", Price Bid and DD for Tender document Cost (if applicable) & EMD duly super scribed and put in an outer envelope, super scribing the Name of work, Tender no. and Name and address of the Tenderer.**
5. The local address of the Contractors, the name of the person to whom all the Correspondence are to be addressed should be indicated, with telephone number (both office and residence).
6. All entries in tender documents should be in one ink (preferably blue ink). Erasing and overwriting is not permitted. All corrections should be duly signed by tenderer concerned.

NIT Issued By
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CONTRACTOR (SIGN & SEAL)

7. Tenderers shall fill in all the required particular in the blank space provided for this purpose in the tender documents and also sign in each and every page of the tender document including the drawings attached there to before submitting tender.

8. Unit rate/percentage above or below estimate should be quoted in figures as well as in words in Indian Currency only i.e. Rupees and Paisa with reference to each item and for the items shown in the attached schedule. These rates shall be for the finished work at site. The rate shall include all taxes and duties payable on account of Octroi, tax on work contract etc., and also expenses towards PF and ESI contributions (see clauses 8, 40 and Enclosure 'C') but excluding

9. In case the rate quoted in figures differs from those quoted in words, the lower of the rates quoted will be taken as the tendered rate and shall be binding on the tenderer.

10. The rate to be quoted by the tenderer shall be firm and shall cover and include all statutory levies such as "Octroi, excise duty etc., arising from Act passed by Parliament or State Legislature and rules framed there under. The rates shall further be deemed to include statutory levies arising from such Acts, Central or State, which may come into force, subsequent to submission of tenders.

11. (a) The rate quoted in the tender shall remain valid for a period of 'THREE MONTHS' from the date of opening tender.

(b) Tenderer shall not increase quoted rates, once the tenderer has submitted offers/quotation/price and during execution of contract in case tender is accepted.

(c) Successful bidder should execute the work strictly in accordance with Tender schedule quoted rates as accepted by BHEL.

(d) **PRICE VARIATION clause not applicable**.

12. The rates quoted should be inclusive of all taxes arising on the transaction. If BHEL is required to discharge the liability of any taxes on the transaction like TDS(IT), TDS(WCT), TDS(GST) (as applicable) under reverse charge mechanism or any other similar taxes, which is or becomes payable by BHEL, the same shall be deducted from the bills of the contractor. **The rate/Percentage quoted by bidder shall be including all taxes but excluding GST which shall be shown separately in price bid.**

13. Quantities shown in the schedule are only approximate and are liable to variation without entitling the Contractors to any compensation.

14. Before tendering, the tenderer are advised to inspect the site of work and its environments and be well acquainted with the actual working and other prevailing conditions, position of material and labour. They should be well versed with BHEL General Conditions of Contract instruction to the tenderers, drawing and specification and all other documents which form part of the agreement to be entered into subsequent to award of work. The tenderer should be specially note that it is tenderers responsibility to provide any items which is not specifically mentioned in the specifications and drawing, but which is necessary to complete the work.

15. Details and quantities of each item of work shown in the bill of quantities attached here to only approximate. They are given as a guide for the purpose of tendering only and are liable for variation and alteration at the discretion of the competent authority. The work under each item as executed shall be measured and price at the corresponding rates to be quoted by the Contractor in the bill of quantities attached hereto.

16. Should a tenderer find discrepancies or omission in the drawing attached to the tender documents or should be in doubt as to their meaning he should at once address to the authority inviting the tender for clarifications. Every endeavor is made to avoid any error which can materially affect the basis of the tender but successful tenderer shall take upon himself to provide for the risk of any error which may be subsequently discovered and shall make no subsequent claim on account thereof.

17. In the event of the tender being submitted by a firm the tender must be signed separately and legibly by each partner or member of the firm or in their absence, by the person holding the power of Attorney on behalf of firm concerned. In the latter case, a copy of the power of Attorney duly attested by a Gazette Officer must accompany the tender.

18. If in any case, the date of Tender Opening falls on holiday, the Tender will be opened on the next working day.

19. Every tender must be accompanied by Earnest Money Deposit. This earnest money will be refunded to the unsuccessful tenderer after finalization of the award of work. In the case of successful tenderer, the earnest money will be retained as a part of Security Deposit for satisfactory completion of the work in accordance with Clause-16 of BHEL General Conditions of the Contract. Tenders without Earnest Money Deposit receipt are liable to reject. No interest will be paid on the earnest money deposit.

20. The Earnest money deposit may be furnished

a) Demand Draft in favour of BHEL EDN, Bangalore – 560026.

b) The Earnest money deposit may be furnished through online from SBI Collect.

Guidelines for payment of EMD Fee

Step-1: Please enter the following link in your internet address browser or click on the following link.
https://www.onlinesbi.com/sbicollect/icollecthome.htm
Please click on"proceed" after Clicking "Check Box" to proceed for payment
Step-2 : Now the SBI's SB-Collect site gets opened. Please select State of Corporation as " Karnataka" and type of Corporation as " Industry" and then click on "Go" appearing on the screen.
Step-3 : Now select " Bharat Heavy Electricals " from the dropdown table appearing against "Industry Name" and click Submit
Step-4: Now select " Others " from the dropdown table appearing against "Category" and click Submit
Step-5: The below screen (similar) will appear. Please select sub category "EMD" and fill up other details and transfer money.

21. For reimbursement of Earnest Money Deposit, the tenderer should fill the enclosed EFT form, obtain the Banker's signature and also enclose a photocopy of cancelled cheque leaf.

22. Unless the bidder whose tender is accepted signs contract agreement within fifteen days (15 days) of the date of the order directing to do so, the amount of Earnest Money already deposited by bidder will be forfeited and acceptance of the tender withdrawn.

23. If after opening of tenders a tenderer revokes the tender or increase of earlier quoted rates or after acceptance of his tender does not commence the work in accordance with the instruction of Engineer-in-charge, the Earnest Money Deposited by bidder will be forfeited and acceptance of bidder's tender withdrawn.

If only a part of work included in the tender had been awarded to the tenderer, the amount of Earnest Money to be retained will be based on value of the contract so awarded.

24. The BHARAT HEAVY ELECTRICALS LIMITED reserve the right to reject any or all the tenders received or accept any tender or part thereof without assigning reason thereof. In the case of acceptance of a part of tender, the time for completion may also be reduced to the extent considered necessary by the accepting authority.

25. Conditional and Unsigned tenders, tenders which are incomplete or otherwise considered defective, tenders which are not in accordance with the tender conditions laid down by the accepting officer and tenders not submitted in the prescribed forms are liable to be rejected.

26. The tenderers should enclose relevant documents regarding constitution of firm i.e. Individual / Sole Proprietorship Concern / Partnership Firm / Public Limited Company / Private Limited.

27. The tenders should be enclosed with a list of contracts already held by the tenderer at the time of submitting the tender and giving the following particulars:

a) Name of the work, value and address.

b) The balance work remaining to be done on the same.

28. a) The filled in tender sealed cover shall be handed over/couriered/speed post to at office of **Shri .Sreenath M, AGM (SC&PV- PCG,M), NEB 5th Floor, Electronics Division, Bharat Heavy Electricals Limited, Mysore road, Bangalore – 560 026)** before the time fixed for submission of tender.

b) Tenders received after the due date & time of opening of tenders will be rejected.

29. The Contractors responsibility under this contract shall commence from date of receipt of the order or acceptance of tender.

30. Tenders submitted by speed post or courier service shall be posted with due consideration of any delay in postal delivery. Tenders received after the due date of opening tenders are liable to be rejected.

31. If proprietor or partner of a firm expires after the submission of tender or after the acceptance of tender, BHEL reserves the right to cancel the contract if the character of the firm undergoes a substantial change.

32. THE BHARAT HEAVY ELECTRICALS LIMITED will not be bound by any power of Attorney granted by the tenderer or changes in the composition of firm made subsequent to signing of the contract. They may however recognize such power of Attorney and changes after obtaining proper legal advice.

33. If the tenderer deliberately gives wrong information on tender regarding past unsatisfactory performance with BHEL sister units, BHEL reserves the right to reject such tender at any stage including contract execution period.

34. Words imparting the singular number shall also be deemed to include the plural number and vice-versa where the context so require.

35. The General and Special Conditions are complementary to each other and where they are in conflict, the special condition shall prevail.

36. The expenses for completing the stamping agreement shall be paid by the contractor.

37. Unless or otherwise stated above tendered work includes men, material, machine and commissioning of equipment as agreed to in the contract.

38. After completing of the job, the contractor has to furnish actual drawings of work done in consultation with Engineer-in-charge.

39. Any covering letter and comments of the tenderer should be submitted along with the offer.

40. Cement and steel for carrying out Civil Works will have to be procured by the Contractor. Materials shall be accompanied with Test certificates and connected dispatch documents for proof of source from approved manufacturer's works or stockyard. The Contractor shall provide all the materials needed for trial run, testing including chemicals, consumables etc. In quoting their rates, the Contractors are advised to take into account the cost of the above materials. All the construction materials should be approved by BHEL before commencement of work.

41. Contractor are required to follow Floater manual for module assembly and PV array layout for poisoning as approved by BHEL/customer in respect of Tests to be carried out and reports and documents to be furnished.

42. Should a tenderer or a contractor has a relative or in the case of firm or company, any of its shareholders relative is employed in Bharat Heavy Electricals Limited, the authority inviting tenders shall be informed of this fact at the time of submission of the tender, failing which tender may be disqualified or if such fact subsequently comes to light.

43. These 'INSTRUCTIONS TO TENDERER' & GENERAL CONDITIONS OF CONTRACT OF BHEL' shall be deemed to form an integral part of the Contract agreement for the work to be entered into. The Contractor has to scrutinize the same, and when submitting his tender, indicate his acceptance of both. In cases of variation between the two in any matter, the conditions in the 'THE INSTRUCTIONS TO TENDERER' shall prevail. (Extracts of important clauses of BHEL GCC are enclosed).

44. All operations to be carried out by the Contractor during the execution of the contract such as module assembling, earthing wiring etc., shall be done with proper equipment to be brought by the tenderer. Contractor shall make his own power and water supply.

45. The Contractor shall comply with the provision of Employees Provident Fund's and miscellaneous Provisions Act 1952 and rules, regulations and other orders issued there under. He as an employer shall be liable to pay employer's contribution/deductions towards PF under the PF Act in respect of all labour employed by him for the execution of the contract in accordance with the provisions of the Employees' Provident Funds and Miscellaneous Provisions Act, 1952 as amended from time to time. For this purpose he shall indicate the code number obtained from the Regional Provident Fund Commissioner or he should obtain a code number if he has not and produce the Photostat copy of the challan receipt of monthly remittance of the contribution made by him to the Commissioner. He shall also furnish such returns such returns as are due, under the Act, to be sent to the appropriate authorities through the Principal Employer".

46. The Contractor should get himself registered with the E.S.I Authorities as an independent Employer, obtain a separate code number and remit the dues in respect of the Labour employed by him for the work and produce the challan/Receipts of remittance of the ESI contributions due under the E.S.I Act to the Company authorities. He shall also furnish such returns, as are due, under the Act, to be sent to the appropriate authorities' through the Principal Employer. The contractor can remit their ESI & PF through a sub-agent who processes the ESI & PF code and agrees to enter an MOU with the contractor.

45. If any action is brought in by P.F. Commissioner/ESI authorities on BHEL for the work done by the Contractor for his labourers regarding PF/ESI amount due, short remittances, non-remittances etc., the Contractor shall defend the case on behalf of BHEL and / or reimburse BHEL the expenses so incurred.

46. The Contractor shall apply and obtain license under Contract labour (R&A) Act 1970 and comply the relevant provisions of this Act in respect of the labour employed by him for executing this contract. The contractor shall furnish necessary returns to the authority through the Principal Employer.

47. Contractor shall insure all his labourers and material. Any claim by his Employees for damages shall be settled by the Contractor even if action is against BHEL or to reimburse the legal expenses incurred by BHEL.

48. Any action brought in by anybody on BHEL regarding patent, right etc., used by Contractor in execution of work shall be defended by the Contractor and / or reimburse BHEL the cost of the same.

49. Contractor shall produce necessary records, documents; explanation whenever he is called upon to do by any Government Agencies.

50. Contractor should obtain "Workmen Compensation Policy" for their Employees.

51. BOAT, SAFETY JACKET,TOOLS ETC.,

a) Unless otherwise specified in the tender schedule, the rates for all items will be deemed to include boat, safety jacket for worker involved in the work.

b) No separate payment will be made for dewatering (including seepage, surface drainage and monsoon water) desludging and allied operations at any stage of the work, and the cost of such operations will be deemed to be included in the contract rates.

c) No separate payment will be made for curing including pumping of curing water where ever necessary.

52. EXTRA ITEMS

No extra items of work shall be carried out by the contractor other than those authorized to do so in writing by the Engineer-in-charge. For any such items of work executed as per instructions of Engineer-in-charge, the rates will be fixed on the basis indicated under clause 50 as per terms and conditions of BHEL.

BHARAT HEAVY ELECTICALS LIMITED

(ELECTRONICS DIVISION)

MYSORE ROAD- BANGALORE-26

GENERAL CONDITIONS OF CONTRACT/TECHNICAL SPECIFIC ATION

It is hereby agreed by me/us that the BHEL General Conditions of Contract including subsequent amendments/ additions/deletions to clauses if any, and conditions pertaining the settlement of disputes by Arbitration form an integral part of the tender documents and that the tender submitted by me/ us is subject to the aforesaid BHEL General Conditions of Contract/ Technical Specification for BOS1 works which has been read and accepted by me/us.

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NIT Issued By
PUNAM MISHRA,
Sr. Manager- SC & PV - ENGG.

CONTRACTOR (SIGN & SEAL)

ENCLOSURE: A

CLAUSE 20 OF GENERAL CONDITIONS OF CONTRACT

LABOUR

The Contractor shall employ labour in sufficient numbers either directly or through sub-contractors to maintain the required date of progress and of quality to ensure workmanship of the degree specified in the contract and to the satisfaction of the Engineer-in-charge. The contractor shall not employ in connection with the works any person who has not completed his eighteen years of age.

The contractor shall furnish to the Engineer-in-charge at the intervals specified by him. A distribution return of the number and description by trades of the work people employed on the works. The Contractor shall also submit on the 4th and 19th or every month to the Engineer-in-charge a true statement showing in respect of the second half of the preceding month and the first half of the current month (i) the accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them and (ii) the number of female workers who have been allowed maternity benefits as provided in the maternity benefit Act, 1961 or Rules made there under and the amount paid to them.

The contractor shall pay to labour employed by him either directly or through sub-contractors wages not less than fair wages as defined in the contractors Labour Regulations.

The Contractor shall in respect of labour employed by him either directly or through sub- contractors comply with or cause to be complied by with sub-contractors, labour Regulations in regard to all matters provided therein.

The Contractors shall comply with the provisions of the payment of wages Act, 1936, Minimum Wages Act, 1948, Workmen's Compensation Act 1923, Industrial Disputes Act, 1947, Maternity Benefit Act 1961 or any modifications there of or any other law relating thereto and rules made there under from time to time.

The Contractors shall be liable to pay his contribution and the employees' contribution of the State Insurance Scheme in respect of all labour employed by him for the execution of the contract, in accordance with the provision of "The Employees', State Insurance Act, 1948", as amended from time to time. The Contractors shall apply to the ESI Authorities, get himself registered with them and obtain a code Number. He shall pay the remittances under his code Number only. The Contractor shall be liable

to pay his contribution and the Employees' contribution towards PF as per Provident Fund Rules and Regulations in respect of all labour employed by him for the execution of the contract.

The contractor shall apply to the PF Authorities, get himself registered and obtain a code number from them. He shall pay the remittances towards PF under his code Number only. The Engineer-in-charge shall on a report having been made by an Inspecting Officer as defined in the Contractors Labour Regulations have the power to deduct from the moneys due to the Contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfillment of the conditions of the contract for the benefit of workers, non - payment of wages or of deductions made from him or their wages which are not justified by the terms of the contract of non-observance of the said contractor's Labour Regulations.

The Contractors shall indemnify the BHEL against any payment to be made under and for observance of the regulation aforesaid without prejudice to his right to claim indemnity from these sub-contractors.

MODEL RULES FOR LABOUR WELFARE

The Contractor shall at his own expense comply with or cause to be complied with model Rules for Labour Welfare as appended to these conditions or rules framed by Government from time to time for the protection of health and for making sanitary arrangements for workers employed directly or indirectly on the works, In case the Contractors fails to make arrangements as aforesaid the Engineer-in-charge shall be entitled do so and recover the cost thereof from the contractor.

ENCLOSURE: B

SAFETY CODE

RESPONSIBILITIES OF THE CONTRACTOR IN RESPECT OF SAFETY OF MEN, EQUIPMENT, MATERIAL AND ENVIRONMENT

1. Before commencing the work, contractor shall submit a "SAFETY PLAN" to the authorized BHEL Official. The 'SAFETY PLAN' shall indicate in detail the measure that would be taken by the contractor to ensure safety of men, equipment, material and environment during execution of the work. The plan shall take care to satisfy all requirements specified hereunder. During negotiations before placing of work order and during execution of the contract BHEL shall have right to review and suggest modification in the Safety Plan. Contractor shall abide by BHEL decision in this respect.

2. The contractor shall take all necessary safety precautions and arrange for appropriate appliances as per direction of BHEL or its authorized officials to prevent loss of human lives, injuries to personnel engaged, and damage to property and environment.

3. The contractor shall provide to its work force and ensure the use of the following personal protective equipment as found necessary and as directed by the authorized BHEL Officer:-

(i) Safety life jacket to IS 6685/SOLAS

(ii) Safety Shoes conforming to IS-1989: 1978.

(iii) Eye and Face protection devices conforming to IS-8520: 1977 and IS-8940: 1978.

(iv) Hand and body protection devices conforming to:

IS-2573: 1975

IS-6994: 1973

IS-8807: 1978

IS-8519: 1977

All tools, tackles, lifting appliances, material handling equipment scaffolds, cradles, safety nets, ladders, equipment's etc. used by the contractor shall be of safe design and construction. These shall be tested and certificate of fitness obtained before putting them to use and from time to time as instructed by authorized BHEL Official who shall have the right to ban the use of any item.

All electrical equipment's, connections and wiring for constructions power, its distribution and use shall conform to the requirement of the Indian Electricity Act and Rules. Only electricians licensed by the appropriate statutory authority shall be employed by the contractor to carry out all types of electrical works.

All electrical appliances including portable electric tools used by the contractor shall have safe plugging system to source of power and be appropriately earthed. The contractor shall not use any hand lamp energized by electric power with supply voltage of more than 24 volts. For work in confined space lighting shall be arranged with power sources of not more than 24 volts.

The Contractor shall adopt all fire safety measures as laid down in the "Code for fire Safety at Construction Sites" issued by the Safety Department of the Construction Management (HQ) of BHEL and as per directions of the authorized BHEL Official. A copy of the above referred "Code of Fire Safety at the Construction Sites" shall be made available by BHEL to the contractor for reference, on demand by the contractor, during tendering stage itself.

Where it becomes necessary to provide and/or store petroleum products, explosives, chemicals and liquid or gaseous fuel or any other substance that may cause fire or explosion, the contractor shall be responsible for carrying out such provisions and/or storage in accordance with the rules and regulations laid down in the relevant government acts, such as Petroleum Act, Explosives Act, Petroleum and Carbides of Calcium Manual of the Chief Controller of Explosives, Govt. of India. etc., prior approval to the authorized BHEL Official at the site shall also be taken by the contractor in all such matters.

The contractor shall arrange at his cost (wherever not specified) appropriate illumination at all work spots for safe working when natural daylight may not be adequate for clear visibility.

The contractor shall be held responsible for any violation of statutory regulations local, state or central and BHEL instructions that may endanger safety of men, equipment, material and environment in his scope of work or another contractor or agencies. Cost of damages if any, to life and property arising out of such violation of statutory regulations and BHEL instructions shall be borne by the contractor.

In case of a fatal or disabling injury accident to any person at construction sites due to the lapses by the contractor, the victim and/or his/her dependents shall be compensated by the contractor as per statutory requirements. However, if considered necessary, BHEL shall have the right to impose appropriate financial penalty on the contractor and recover the same from payments due to the contractor for suitably compensating the victim and/or his/her dependents. Before imposing any such penalty, appropriate enquiry shall be held by BHEL giving opportunity to the contractor to present his case.

In case of any damage to property by the contractor, BHEL shall have the right to recover cost of such damages from payments from payments due to the contractor after holding an appropriate enquiry.

In case of any delay in the completion of a job due to mishaps attributable to lapses buy the contractor; BHEL shall have to recover cost of such delay from payments due to the contractor, after notifying suitably and giving him opportunity to present his case.

If the contractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given a reasonable opportunity to do so; and/or if the contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions regarding safety issued by the authorized BHEL Official, BHEL shall have the right to take corrective steps at the risk and cost of the contractor after giving a notice of not less than seven days indicating the steps that would be taken by BHEL.

The contractor shall submit report of all accidents, fires and property damage, dangerous occurrence to the authorized BHEL Official immediately after such occurrence, but in any case not later than twelve hours of the occurrence. Such reports shall be furnished in the manner prescribed by BHEL. In addition, the contractor to the authorized BHEL Official shall also submit periodic reports on safety from time to time as prescribed.

Before commencing the work, the contractor shall appoint/nominate a responsible officer to supervise implementation of all safety measures and liaison with his counterpart of BHEL.

If safety record of the contractor in execution of the awarded job is to the satisfaction of Safety Department of BHEL, issue of an appropriate certificate to recognize the safety performance of the contractor may be considered by BHEL after completion the job

SPECIAL CONDITONS OF CONTRACT

1. GENERAL

The special conditions of contract and other contract documents are complimentary to each other and shall be read in conjunction with each other. In case of any conflict of meanings between the special conditions of contract and the BHEL General Conditions of Contract the provisions of the special conditions of contract shall override the corresponding provisions of the BHEL General Conditions of Contract.

2. SCOPE OF WORK

Details Scope of work is attached along with following other relevant enclosures-

a) SCOPE OF WORK CUM TECHNICAL SPECIFICATION (BOS1) – Annexure-IV
b) Installation manual (1) - Annexure-V
c) Installation manual (2) - Annexure-VI
d) Specification of ESE Lightning Arrestor System - Annexure-VII
e) BHEL SAFETY PLAN FOR 100 MW FSPV - Annexure-VIII
f) PV array Layout -Annexure-IX

3. SITE CONDITIONS

a) Before tendering the Contractor shall get themselves acquainted with site conditions such as quality of reservoir water likely to be encountered during the course of the work etc,. The rates quoted by the contractor shall be deemed to have been quoted after getting acquainted with the prevailing site conditions. No claims on the pretext of ignorance of site conditions shall be entertained.

b) The site of work is as mentioned in the Tender document.

4. SITE FACILITES

A. Reservoir and Floating Details

Reservoir details:

Full reservoir Level (FRL):168 M
Minimum Drawdown Level (MDDL):162.30 M

The Employer will allot land near reservoir as available free of cost to the contractor for his office stores. He must maintain the areas allotted to him in a neat and clean conditions as required by the Employer. The contractor shall provide adequate storage and office facilities with approval from the

Engineer. The rate quoted by the contractor shall be deemed to include for these and no separate payment will be made towards these. On completion of work, the site shall be cleaned by the contractor of all materials, temporary debris, rubbish plants and equipment's, belonging to the contractor at no extra cost. The site and surroundings shall be handed over in a neat and clean condition. In case of any failure by the contractor, the employer will get inside cleared at risk and cost of the Contractor.

B. POWER AND WATER SUPPLY

Facilities for drawing Power and water required at site for execution of the works shall be arranged by the contractor at his expense and risk. The necessary source for power & water supply has to be organized by vendor. Necessary distribution box, extension board points duly earthed, and with armoured safe power cables to be laid across the field provided point shall be in the scope of the tenderer. Further, laying of water intake and distribution pipes across the Site to various points of work from Electricity source provided water source point shall be in the scope of the tenderer. If required D.G generation sets shall be provided for Power arrangement by the contractor at his own cost. The tenderer shall make provision for temporary storage of water at suitable locations with pump if required to reach the water supply to work areas. The contractor will have to make his own arrangements for the same, without claiming any extra charge for the power and water drawal and distribution equipment.

5. MACHINERY

The Contractor shall at his own expense, supply all tools, plant and equipment (hereinafter referred to as T & P) required for execution of contract, as specified in the tender documents. whole of the works shall be executed in perfect conformity with the specifications and drawings. If contractor perform any works in a manner contrary to the specifications and drawings and without reference to the Engineer-in-charge, he shall bear all the costs arising or ensuring there from.

a) All technical documents regarding the construction of works are given in the metric system and work should be carried out according to metric system.

b) The work shall be carried out as per detailed drawings supplied by the employer. The working drawings shall be emailed progressively to the contractor free of cost. The contractor shall keep

one set of drawings (duly protected from dust and wear and tear) at his own expenses always available at site for reference of Engineer-in-charge and other representatives.

c) The works shall be carried out as per detailed specifications enclosed with the tender. For items for which there is no mention in the drawings, detailed specification relevant IS specification (latest edition) shall be followed.

d) The contractor shall submit to the Employer for their approval complete drawings, of all temporary works and staging which he may require for carrying out the works shown in the drawings.

He shall at the same time if so required by the Employer submit his calculations relating to strength and anticipated deflection in respect of any aforesaid temporary works. He shall also submit for the approval of Employer drawings showing the methods he proposes to adopt for the erection of the various parts of the temporary works. Any modification to the drawings that may be required by the Employer shall be made by the contractor at his own cost. However, notwithstanding the approval of modification required for temporary works, the contractor shall be fully responsible for their efficiency, security and maintenance and for all obligations and risks in regard to such works, specified or implied in this contract and be shall reinstate the same at his own cost, should any mishap or accident occur causing damage or injury there from, subject however, to such clauses of the General conditions as may be applicable in such cases.

6. BENCH MARKS AND REFERENCE POINTS

The contractor shall construct and maintain proper benchmarks and reference points at the allotted area near bank of reservoir on BHEL supervision, no separate payment shall be made for this and rates quoted deemed to include this cost. Surveying where ever required is in contractor scope.

7. SAFETY PRECAUTIONS

The contractor shall at times observe the safety code and make necessary action as required in the tender. In default thereof, the employer may get this done departmentally or through other agencies and recover the cost from the contractor.

The Contractors shall also abide by all the security regulations promulgated from time to time by employer.

8. RATES

The rates to be quoted are intended to provide for works duly and properly completed in accordance with the general and special conditions of contract and specifications and drawings together with such

alteration and/or conditions as may be required / ordered without prejudice to the generality thereof shall include for detail of construction which are obviously and fairly intended and which

may not have been specifically referred in these documents and working drawings and but are essential for execution and satisfactory completion of work including those of minor nature and shall be deemed to include and cover internal the followings.

a) Arrangements for obtaining the clearance wherever required from statutory bodies, regarding license for construction, permanent electricity, water supply, and sanitary connections including payment of necessary fees, inspection charges and obtaining financial certificates for using these services.

   The various items rates quoted in the schedule as applicable shall be deemed to include the above services and no separate payments shall be made towards these.

b) The cost of all superintendence and labour materials, tools, plants, equipment's, mobilizing and demobilizing equipment fuel lubricants, fixture, transport charges, temporary and permanent works and quarrying charges, testing, screening, washing, handling of materials, stacking and removal charges, of any rejected materials and water and power arrangements and satisfactory maintenance of the same satisfactory completion of the work intended.

c) All fees, duties, royalties, rent and compensation to owner for water pollution or taxes and impositions payable to local authorities,which the contractor may become liable or may be put to under any provision of the law for the purpose of in connection with the execution of the contract including levies payable on the transactions.

d) Settings out of works profiles etc., and of construction repair and up-keep of all centre lines, bench marks and levels and page there of including provisions of drilling on reservoir bed for earth electrode.

e) Supply of complete, Moulds, cost of testing of materials etc.

f) Working in all conditions including in/under water liquid, conditions etc., and shall also include under water activity.

g) In the interest of completion of work within the stipulated time, certain works are to be carried out during the monsoon period also. No separate payment will be made to the contractor for such works and it will be deemed to be included in the contract rates.

h) All materials and labour required for water activity in a protection against risk of accidents and for providing necessary/life jacket, boat, safety belts etc., during the progress of work.

i) Cleaning the site after the completion of work all debris, left out construction materials machine equipment's, temporary offices, stores, works shop etc., including dressing the area neat and clean shape.

j) Such other incidental charges or contingencies as may have been provided for in the specifications.

9. LABOUR COLONIES

Labour camp will not permitted within the project premises.

10. ESCALATION

The rates to be quoted by the tenderer shall be firm and shall cover and include all statutory levies, arising from, acts passed by parliament or by state legislature, the rates shall further be deemed to include statutory levies arising from such Acts, Central or State, which may come in to force subsequent to submission of tenders. The tenderer shall note that no claim for enhancement of rates, on the ground that existing statutory levies have been increased, or that new statutory levies have come in to effect after tender, or on any other ground, will be entertained on any account.

11. QUANTITY

The probable quantities of the several items of work are furnished in the schedule of quantities. It must be clearly understood that neither the probable quantities nor the value of individual items nor the aggregate value of the entire work shall be binding on the Employer/Engineer does not in any way assure the contractor or Guarantee that the said probable quantities are correct or that the work will correspond to these. The Employer/Engineer reserve the right to omit, vary or add to the item/work described in the schedule, of quantities and no claim for compensation will be entertaining on this account.

12. VARIATION/DEVIATION IN QUANTITIES

The contractor shall not make any alteration in addition to or omission from the work as described in the tender document except in pursuance of the written instructions of the Engineer-in-charge. No such deviation from the work described in the tender documents shall be valid unless the same has been specifically confirmed and accepted by the accepting officer in writing and incorporated in the contract. The rates quoted are firm for deviation subject to minimum of (-) 20% and maximum (+) 20% of the total value of work awarded. Deviation beyond the above limits is subject to the standard terms and conditions of BHEL.

13. MATERIALS

BHEL will not supply any materials unless otherwise specified.

14. SUPPLY BY CONTRACTOR

The work is for a completed job including labour and supply of all materials except those otherwise specified in the bid document.
The material and works shall be subject to inspection and test as per field quality plan (FQP) duly approved by BHEL/ NTPC.

All materials supplied by the contractor according to the contract conditions shall be subject to inspection and passing by the Engineer-in-charge or his representatives from time to time, the contractor providing all facilities for such instruction free of cost.

BHEL officers connected with the contract shall have the power at any time to inspect and examine any stores or materials intended to be used in or on the work, whether on the site or at any factory or workshop or other place where such stores or materials are being fabricated or manufactured or at any place the same are lying and the contractor shall give necessary facilities for such inspection and examination.

The Engineer-in-charge shall be entitled to have tests made of any stores or materials supplied by the contractor shall provide at his own expense all facilities which the Engineer-in-charge may require for this purpose. If at the discretion of the Engineer-in-charge an independent expert is employed to make any such tests his charges shall be borne by the contractor only if the tests disclosed that the said stores or materials are not in accordance with the provision of the contract.
Should the Engineer-in-charge consider at any time during the erection and commissioning on prior to the expiry of the Maintenance Period that the stores or materials provided by the contractor are unsound or of quality inferior to that contracted for, or otherwise not in accordance with the contract (in respect where the decision of the Engineer-in-charge shall be final and conclusive) the contractor shall on demand, in writing from the Engineer-in-charge specifying the stores or materials complained of, not with-standing that the same may have been inadvertently passed, certified that and paid forth with remove the stores or materials so specified and provide other and suitable stores or materials at his own expense, to the entire satisfaction of the Engineer-in-charge and in the event of his failing to do so within a period to be specified by the Engineer-in-charge, in his demand aforesaid, the Engineer-in-charge may replace within the other stores or materials complained of at the risk and expense in all respect of the contractor.

The liability of the contractor under this conditions, shall not extend beyond the maintenance period aforesaid except as regards stores or materials which the Engineer-in-charge shall have previously given notice to the contractor to replace (Maintenance period for any work under this organization will be six months from the date of actual completion of the particular work and handing over to BHEL).

15. INTERRUPTION TO THE WORKS

While quoting the rates/prices the Contractor should take in to account the fact that due to the design or other stipulations at site, or the necessity to follow a particular sequence of overall construction operation, or non-supply of particular drawings, or the connected work or other reasons, interruptions are likely to be encountered in a work of this nature and magnitude. No claims for such interruptions will be entertained on any account.

16. EXTENSION OF TIME OR PENALTY/LIQUIDATED DAMAGES

Extension of time or penalty/liquidated damages as the case may be will be determined as stipulated in clause No. 2.7.9 of BHEL General Conditions of Contract 2019.

17. COMPLETION OF WORK AND MEASUREMENT

a) All work shall be carried out according to authorized dimensions and measurement will be restricted to those authorized dimension even though the Contractor may for convenience of this work exceed the authorized dimensions.
b) All work shall be measured in accordance with the applicable standard method of measurements prescribed by the Indian Standard Institution (1200 latest edition) unless otherwise specified.
c) The Contractor shall admit for technical inspection, works which are likely to be embedded or covered by other works and have the necessary measurement books and certificates to this effect duly signed by the Engineer before the works are covered.
d) On completion of the work, the Contractor must submit to the Engineer the following documents for passing of works.
   i) A copy of the working drawing showing there on all addition and alterations in the process of execution.
   ii) A certificate for embedded and covered up works as in sub-para (C) above
e) The authorized Contractors representative and a representative of the Employer shall jointly sign a certificate of handing over any completed work and date of signature of that certificate will be that the date from which the maintenance period of that unit will reckoned.
f) Notwithstanding the above, insurance cover has to be taken by the contractor for the full value of work as also for the duration of the contract period. 50% of the Security Deposit shall be released only on the total completion of the building and handing over to BHEL to their satisfaction. Remaining 50% of Security Deposit shall be released subject to the stipulation in BHEL after 6 months from the date of completion of site activity.

18. MAINTENANCE OF WORK

The contractor will be responsible for the maintenance of works during the period of commissioning until the various items are taken over, and for a further period of six months, from the date of taking over.

If the contractor fails to maintain the building satisfactorily, it will be got done by other agency and cost towards such maintenance together with departmental charges will be recovered from his bills/dues.

19. SECURITY DEPOSIT

Upon acceptance of the tender, the successful tenderer shall remit the security deposit with Bharat Heavy Electricals Ltd within the time as specified in the Letter of Intent.
The rate of Security Deposit will be 5% of work order value.

The contractor should submit the Security Deposit before the start of the work by

i) Cash (as permissible under the income Tax Act).

ii) Pay order, demand draft in favour of BHEL.

iii) Local cheques of scheduled banks, subject to realization.

iv) Securities available from Post Offices such as National Saving Certificates, Kisan Vikas Patras etc.,(Certificate should be held in the name of contractor furnishing the security and duly pledged in favour of BHEL and discharged on the back).

v) Bank Guarantee from scheduled Banks/Public financial Institutions as defined in the companies Act subject to a maximum of 50% of the total security deposit value. The balance 50% has to be remitted either by cash or in the other form of security. The Bank Guarantee format should have the approval of BHEL.

vi) Fixed Deposit Receipt issued by scheduled Banks/Public Financial Institutions as defined in the Companies Act. The FDR should be in the name of the contractor, A/C BHEL, duly discharged on the back.

vii) Security Deposit can also be recovered at the rate of 10% from the running bills. However in such cases at least 50% of the Security Deposit should be collected before start of the work and balance 50% may be recovered from the running bills.

viii) EMD of the successful tenderer shall be converted and adjusted against the Security Deposit. The Security Deposit shall not carry any interest.

NOTE: Accepting of Security Deposit against Sl. No. (iv) and (vi) above will be subject to hypothecation or endorsement on the documents in favour on BHEL. However, BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.

For extra items of work and deviated quantities, security deposit will be recovered at 10% of the value of deviated amount. The security deposit will be released as stipulated under relevant clause of GCC 2019.

20. RUNNING ACCOUNT PAYMENTS

During execution of work, monthly payments of all works in place will be made on the basic measurements recorded in measurement sheet/book in respect of items executed but no claim on the account will be entertained, if for any reason payments are not so made. PRICE VARIATION clause not applicable.

22.1 MOBILIZATION ADVANCE/ADVANCE PAYMENT - NOT APPLICABLE

22.2 INTEREST & RECOVERY - NOT APPLICABLE

23. Statutory Deduction towards Income Tax will be made as per rules.

24. In respect of all labour directly or indirectly employed on the work by the Contractor, the Contractor shall comply with the provisions of the contract labour (Regulation and Abolition) Act 1970 or any amendment thereof and all legislations and rules of the State and or Central Government or other Authority, framed from time to time governing the protection of health, sanitary arrangements, wages, welfare and safety for labour employed on building and construction works. The rules and other statutory obligations with regard to fair wages, welfare and safety measures, maintenance of the register etc., will be deemed to be part of the contract.

25. The Contractor is required to take insurance for all workers employed on works towards payment for workmen compensation. The insurance has to be taken out within 15 days of the award of work and has to be produced at the time of signing agreement. Half (1/2%) shall be deducted for every bill if the contractor fails to produce a proof of having taken such an insurance to cover his workmen. However the contractor shall be fully responsible for all the consequences arising out of such default. This may also be read with relevant clauses of BHEL GCC 2019.

25. TIME OF COMPLETION

The date of commencement of work shall be counted from the date of handing over the site to the contractor. It may be clearly understood that time is the essence of the contract and the entire work should be completed within the time imposed in the tender document letter of intent.

26. The Contractor has to comply with Building and Other Construction worker's Welfare Cess Act (1996) BOCW .

27. The management of BHEL shall be at liberty to terminate the contract by issuing a month's notice to the contractor without assigning any reason what so ever. As regards unsatisfactory

performance or noncompliance with any of the terms & conditions of the contract by the contractor. The management of BHEL shall have the right to terminate the contractor forthwith without notice & rearrange the balance work through other agencies at the risk & cost of the contractor & under such circumstances, the Earnest Money Deposit/Security Deposit paid by the contractor shall stand forfeited.

28. SPECIAL CONDITIONS OF TENDER

i) The successful bidder should open local office for Technical staff/Administrative group at Bangalore City for easy interactions/ monitoring of work at site./ Attend meetings at Bangalore city/site as and when instructed by BHEL.
ii) Tenderers should not disclose any price bid details/discounts in the technical bids.
iii) The successful bidder should construct site office / toilets for their workmen at site in consultation with Engineer-in-charge.

29. WORKMEN COMPENSATION POLICY

The contractor is required to take Insurance for all the workers employed on the works towards payments for workmen compensation. The Insurance has to be taken out within 15 days of the award of work and has to be provided at the time of signing the agreement. Half percent (0.5%) of the amount shall be deducted from every bill if the contractor fails to produce a proof of having taken such an insurance to cover his workmen. However the contractor shall be fully responsible for the consequences arising out of such default.

LIST OF INDIAN STANDARD

Following is the list of various Indian Standards,
Relevant to the commissioning work

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1. ELECTRICAL WORK

1) IS:732 - 1989 Code of practice for electrical wiring installations.
2) IS:8061 - 1976 Code of practice for design, installation and maintenance of service lines upto and including 650V
3) IS: 11353- 1985 Guide for uniform system of marking and identification of conductors and apparatus terminals.
4) IS: 3043 - 1987 Code of practice for earthing
5) IS:694 - 1990 PVC Insulated cables for working voltages upto and including 1100 V.

2. SAFETY CODE

1) IS: 3043 - 1987 Code of practice for earthing
2) IS: 5216(Part-1)-1982 Guide for safety procedures and practices in electrical work: General.

3. FIRE FIGHTING CODES

1) IS 4736-1986 Galvanizing G.I. Pipes
2) IS 2189-1962 Code of practice for Automatic Fire alarm system
3) IS 732-1973 Code of practice for electrical wiring installation

These standards are indicative, any additional IS standard/specification required to be followed shall be adhered to by the contractor.

FORM OF TENDER

Having examined the invitation to bid, Instructions to Bidder, General conditions of contract, Special conditions, Specifications tender schedule, Contract drawings and other documents for the above work, we the undersigned, offer to construct, erect complete and maintain the whole of the said in conformity with the said bid documents on the terms and conditions and under the provisions set out or called for in the contract documents at the rates listed in the schedule of unit prices or elsewhere in the contract documents.

We undertake if our bid is accepted, to commence the works within 7 days from the date of issue of award and to complete and delivery the whole of the works comprised in the contract as per the time schedule agreed to the contract document.

We agree to abide by this bid for the period of three months from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before expiry of the period.

Until and unless a formal agreement is prepared and executed this bid, together with your award thereof shall constitute a binding contract between us.

ENCLOSURE: C

NIT Issued By
PUNAM MISHRA,
Sr. Manager- SC & PV - ENGG.

CONTRACTOR (SIGN & SEAL)

CLAUSE 58 OF GENERAL CONDITIONS OF CONTRACT

ARBITRATION:

Except where otherwise provided for in the contract all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions herein before mentioned and as to the quality of workmanship or materials used on the work or has been other as to any other questions, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the works, of or the execution or failure to execute the same whether arising during the program progress of the work or after the completion or abandonment thereof shall be referred to the sole arbitration of the Executive Director/General Manager of BHEL and if the Managing Executive Director/General Manager Chief Engineer is unable or unwilling to act, to a as the sole arbitration of some other person appointed by the Executive Director / General Manager, willing to act as such Arbitrator. There will be no objection if the arbitrator so appointed is an employee of BHEL EDN or an employee of any other unit of BHEL and that he had to deal with the matters to which the contract relates and that in the course of its his duties as such he had expressed views on all or any of the matters in dispute or difference. The Arbitrator to whom the to matter is originally referred being transferred or by vacating his office or being unable to act for any reason, such Executive Director / General Manager as aforesaid at the time of such transfer, vacation of office or inability to act, shall appoint account another person to act as arbitrator in accordance with the terms of the contract, such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor. It is also a term of this contract that no person other than a person appointed by such Executive Director/General Manager or an employee appointed as arbitrator as aforesaid should act as arbitrator and the arbitrator shall give reasons for the award.

Subject as aforesaid the provision of the Arbitration Act, 1940 or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceeding under this clause.

It is a term of a contract that the party involving invoking arbitration shall specify the dispute or disputes to be referred to arbitration under this clause together with the amount or amounts claimed in respect of each such dispute.

The arbitrator(s) may from time to time with consent of the parties enlarge extend the time, for making the publishing the awards.

The work under the contract shall, if reasonably possible, continue during the arbitration proceeding and no payment due to or payable to the contractor shall be withheld on account of such proceedings.

The arbitrator shall be deemed to have entered on the reference on the date he issued notice to both the parties fixing the date of the hearing.

The arbitrator shall give a separate speaking award in respect of each dispute or difference referred to him.

The venue of arbitration shall be such place as may be fixed by the arbitrator in his sole discretion.

The award of the arbitrator shall be final, conclusive and binding on all parties to this contract.

Annexure - I

Certificate by Chartered Accountant on letter head

This is to Certify that M/S ....., (hereinafter referred to as 'company') having its registered office at ..... is registered under MSMED Act 2006, (Entrepreneur Memorandum No (Part–II) ..... dtd:....., Category: ..... (Micro/Small)). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as per the latest audited financial year ..... as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No.S.O.1722(E) dated October 5, 2006 :
   Rs.....Lacs
2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED Act, 2006:
   Rs.....Lacs

(Strike off whichever is not applicable)

The above investment of Rs.....Lacs is within permissible limit of Rs.....Lacs for .....Micro / Small **(Strike off which is not applicable)** Category under MSMED Act 2006.

Or

The company has been graduated from its original category (Micro/ Small) **(Strike off which is not applicable)** and the date of graduation of such enterprise from its original category is ..... (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of such enterprise from its original category as notified vide S.O. No. 3322(E) dated 01.11.2013 published in the gazette notification dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name -

Membership number -

Seal of Chartered Accountant

ANNEXURE II

Electronic Funds Transfer (EFT) OR
Paylink Direct Credit Form

Please Fill up the form in **CAPITAL LETTERS** only.
TYPE OF REQUEST(Tick one): _____ CREATE _____ CHANGE

BHEL Vendor / Supplier Code:	
Company Name :	
Permanent Account Number(PAN):	
Address	

City: _____ PINCODE _____ STATE _____

Contact Person(s)	
Telephone No:	
Fax No:	
e-mail id:	

1 Bank Name:	
2 Bank Address:	
3 Bank Telephone No:	
4 Bank Account No:	
5 Account Type: Savings/Cash Credit	
6 9 Digit Code Number of Bank and branch appearing on MICR cheque issued by Bank	
7 Bank swift Code(applicable for EFT only)	
8 Bank IFSC code(applicable for RTGS)	
9 Bank IFSC code(applicable for NEFT)	

A I hereby certify that the particulars given above are true, correct and complete and that I, as a representative for the above named Company, hereby authorise BHEL, EDN, Bangalore to electronically deposit payments to the designated bank account.

B If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold BHEL / transfering Bank responsible.

C This authority remains in full force until BHEL, EDN,Bangalore receives written notification requesting a change or cancellation.

D I have read the contents of the covering letter and agree to discharge the resposibility expected of me as a participant under ECS / EFT.

Date:

Authorised Signatory:
Designation: Telephone NO. with STD Code

Company Seal

Bank Certificate

We certify that_____has an Account No_____ with us and we confirm that the bank details given above are correct as per our records.

Date: (.....)
Place: Signature

Please return completed form along with a blank cancelled cheque or photocopy thereof to:
Bharath Heavy Electricals Ltd,
Attn:
Electronics Division, Mysore Road,
BANGALORE - 560 026
In case of any Querry, please call : 080-26998xxx / 2674xxxx or fax no. 080-2674xxxx

ANNEXURE-III

Ref.
Date:

SITE INSPECTION CERTIFICATE

This is to Certify that, I / We……..

……. had inspected the proposed

Construction site thoroughly and understood the scope of works to be carried out in line with construction drawings/designs/data/Bill of quantities/schedule of items / Specifications as brought out in the Tender as desired by BHEL.

Agreeable to all Terms & Conditions of Contract and assure to complete the work Within the stipulation time frame.

Signature of the contractor

Name:
Seal

Additional Clauses for GST:

1. BHEL GST Number of Nodal Agency:

   Nodal Unit Registered as Supplier of Goods/Services in GST: Telangana
   GSTIN of Nodal Unit: Will be intimated later after award of work.

2. HSN (Harmonized System of Nomenclature) / SAC (Services Accounting Code) to be mandatorily mentioned in all quotations & invoices submitted.

3. Invoice submitted should be in the format as specified under GST Laws viz. all details as mentioned in Invoice Rules like GSTN registration number, invoice number, quantity, rate, value, taxes with nomenclature – CGST, SGST, IGST mentioned separately, HSN Code / SAC Code etc.

4. Payment of GST to vendors as applicable will be made only if it is matching with data uploaded by Vendors

5. Vendors to give undertaking that GST as mentioned in the Invoice has been paid/will be paid either through cash or admissible input credit and also file the returns

6. For invoices paid on Reverse charge basis – that it is “payable on reverse charge basis” to be mentioned on the invoice.

7. With respect to supplies, vendor should intimate BHEL immediately on dispatch for parallel billing on customer

8. Vendor should get GST registration, if not available, in the state of Telangana immediately after placement of order.

SCOPE OF WORK CUM TECHNICAL SPECIFICATION (BOS1) for 100MW (AC) Floating Solar Photovoltaic Grid-connected Power plant for NTPC at Ramagundam, Telangana

1.0 Introduction:

1.1 Overall project outline of 100MW (AC) Floating solar photovoltaic power plant:

Bharat Heavy Electricals Limited (BHEL), Electronics Division, Bangalore is setting up a 100MW (AC) Floating solar photovoltaic (SPV) power plant for NTPC Ltd. at Ramagundam STPP, Peddapelli District, Telangana.

The supply of all floatation devices including hardware for forming floating islands shall be in scope of BHEL. However assembly of floatation devices as per OEM manual shall be in bidder's scope. All necessary on site hands on training for assembly of floatation devices will be given to the bidder's labourers by OEM of floatation devices and BHEL. Design, Anchoring and mooring of the floating island is in the scope of BHEL.

After forming floating island, the installation of BHEL supplied SCBs and cables on the floating island shall be in the scope of bidder. The floating solar array shall be formed as per the BHEL drawings.

Solar PV modules employed at the plant, generates DC electricity that in turn shall be inverted to AC in the range 300-400V. The output voltage from inverter/PCU stepped upto 33KV level.

The combined 100MW output at 33KV level shall be terminated in the NTPC switchyard which is approximately **2500 meters away.** Laying of **12-runs of 33KV (Armoured HT), 1CX630 sq.mm cable** shall be in the scope of BHEL. A schematic Array layout is attached for ready reference.

Array Layout details for 100MW Floating solar:
Total no of PV-Modules: 447700
Total blocks =40
PV Module in each block = 11180 approx

2.0 Scope of Work

The table below briefly indicates the scope of work for the bidder, as briefly outlined.

#	Bidder scope of work (as summarized outlined)	Qty
1	**I&C:** Excavation of isolated earthen/ sand dunes in the reservoir bottom. The location of earthen/sand dunes are marked in the layout and the final level required is also indicated. After excavation this earth is to be disposed at the desired location. (Disposal location shall not exceed 1km).Vendor has to mobilize his team for excavation during the Anchoring and Mooring work done by BHEL.Mobilization of excavation team to be done within 10 days of BHEL intimation for the same.	2500 cum(m3)
2	**I&C:** Installation of floating pontoons and modules as per the instructions and on-site hands-on training by the OEM of pontoons. Supply of pontoons, modules and hardware for installation is in BHEL scope. Anchoring and mooring of the floating island is also in BHEL scope. As per OEM, approximate labour required shall be 3 modules/ hour/ person. Total number of modules to be installed for 100MW is 447700 Nos. All tools ,tackles and Infrastructure like boats required for Installation of Floaters shall be in the scope of bidder. Bidder has to prepare required no of launch pads to install the floating platform in the required time duration. (1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	40 AU
3	**I&C:** Connection of anchoring ropes/chains to each floating island as per drawing (1AU=2.5MWAC Block consisting of approx 11180 SPV modules) Each 2.5MW Island has approx. 76 -80 connection points for Anchoring and Mooring.	40AU
4	**I&C:** Interconnection of SPV modules, installation of 14 Nos of SCBs , laying/ termination/ ferruling of solar array 1Cx6sqmm cable including related conduit	40 AU

	works. (1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	
5	**I&C:** Earthing of 11180 Nos modules and 14 Nos of SCBs using combination of earthing cables of adequate size and earthing strip/flats(1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	40 AU
6	**I&C:** Installation of earthing electrodes on reservoir bed and interconnection to earthing grid (using bare conductor or flexible cables) Supply of Bare conductor or flexible cable for interconnection to earthing grid is in bidder scope. The sizing of the conductors and earth grid shall be as per detailed engineering calculations to be furnished by the bidder as per site conditions. (1 AU= one number of installation of earthing electrode and interconnection to earthing grid)	80AU
7	**I&C:** Installation of 2 Nos of ESE type LA on each floating platform. LAs on pond shall be placed as per tentative layout. All necessary structure supply work/fabrication required for mounting arrangement of LA on floating platform is under bidder scope. Making earthing connection of down conductor from LA to earth electrode on reservoir bed. Installation of earthing electrodes on the reservoir bed. (1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	40 AU
8	**I&C:** I&C of Miscellaneous items such as cable ferrules, cable ties and cable markers (1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	40 AU
9	Supply of 285 pairs of M/s.Multi contact make MC4 connectors for string connection, 285 pairs of M/s. Multi contact make Y Connectors, cable ties for 6 sq.mm cable routing from row end to SCB (1set = Total number required for connection of 2.5MWAC Block consisting of approx 11180 SPV modules)	40set
10	Supply of HDPE DWC pipe for routing of 6sqmm cables through pathways where SCBs are mounted. (Refer Clause 4.8(2) regarding details of item)	17KM
11	Supply of couplers, joints, bends etc. for 6 sq.mm cable routing from row end to SCB through HDPE DWC pipe (1 set = Total number required for HDPE pipe laying of 2.5MWAC Block consisting of approx 11180 SPV modules)	40 set
12	Supply of 2.5sqmm lugs and M4 size screw of SS-304 grade for earth cable connection on PV module frames.	895400 set
13	Supply of SCB support structure (Aluminium) and SS304 hardware suitable for mounting SCBs on HDPE floating pontoons.	560Nos
14	Supply of 2.5 sq.mm earthing copper cable (Yellow Green PVC sheathed) for inter connecting 20 modules in a row. (Total nos of rows are 22385)	190km
15	Supply of ESE type lightning arrester including 5-meter pole/rod, counter, earthing materials, down conductors, earthing rod below water etc.	81 set
16	Supply of 25*3 MM GS/CCS earthing strip for earth grid formation	64KM
17	Supply of SCB earthing cable with necessary lugs and hardware (1 set= Total number required for cable laying for one SCB)	560 Set
18	Supply of Water washing system for SPV modules (Module cleaning system)	10 Sets
19	SPV module wash for Three cycles only (1 AU = 2.5MW Block module wash once per month)	120AU
20	Supply of life jackets as per IS 6685.(IROS approved makes)	40Nos
21	Supply of small passenger boat for 5 persons including driver. Boat shall be with FRP body construction and 6-8 HP outboard diesel/petrol engine motor (reputed make like Suzuki/Yamaha/equivalent). Boat shall be certified for water worthiness by concerned agency like IROS (Indian register of shipping/MMD/SOLAS/Govt. Department as applicable). Boat shall come equipped with 5 life jackets and shall have Nylon ropes for towing, anchoring, mooring and Air tubes (3 Nos.) for functioning in rescue work.	1 No.
22	Deputation of Safety Supervisor for duration of I&C (months)(1AU=For one month)	6AU

3.0 BHEL scope of supplies (I&C in bidder scope):

For clarity to the bidder, other items and activities within BHEL scope of solar PV plant end of the project are listed below:

1	Supply of solar PV modules	447700 Nos
3	Supply of floating pontoons for modules	As per requirement
3	Supply of floating pontoons for SCB and LA	As per requirement
4	Supply of Floats for Laying 6 sqmm Solar Cable	As per requirement
4	Supply of 1C x 6 sqmm Solar Cable	~ 680 KM
9	Supply of String Monitoring Box (SCB)	565 Nos

4.0 Brief specification for installation and commissioning:

4.0	**Electrical power / water for construction:** Electrical Power for construction will be arranged by the Bidder as per requirements. For construction and cleaning of modules the Reservoir water can be used. Power supply may be arranged by the vendor either through DG sets or by obtaining temporary connection from local utility till the completion of the works.
4.1	Excavation of isolated earthen/ sand dunes/sand banks in the reservoir bottom. The location of earthen/sand dunes are marked in the layout and the final level required is also indicated. After excavation this earth is to be disposed at the desired location. (Disposal location shall not exceed 1km).Vendor has to mobilize his team for excavation during the Anchoring and Mooring work done by BHEL. Mobilization of excavation team to be done within 10 days of BHEL intimation for the same.
4.2	**Installation of floating pontoons with module mounting mechanism:** HDPE floaters and HDPE hardware, Total quantity = 447700 Nos. (BHEL scope of supply), Bidder shall be imparted necessary training to carry out the work of assembly of floatation platform and surrounding pathway using the HDPE floaters and HDPE hardware and for mounting of the PV modules on the floaters. The bidder has to arrange work men who shall be trained by the OEM of floater platform to carry out the work and to further ensure and supervise the proper assembly and quality of the platform and module mounting. The vendor shall arrange the following essential tools/accessories and Safety personnel to enable safety to equipment and work men during the course of work: 1. Provide Life jackets for all workers working on water body 2. Provide Inflatable / other small boats for work over water and for towing floaters. Boats employed shall have water service fitness certificate issued by IROS/Govt agency 3. Provide and lay carpet of Rubber/HDPE/Canvas sheets on land next to water body for enabling assembly of floaters without damage due to friction/scratches on concrete/ground and launching by sliding into water 4. Provide temporary nylon ropes for tying floaters to shore before assembly and for towing upto work point and for cordoning safe areas of working 5. Provide sheets for holding hardware and cabling accessories for assembly without accidental dropping into water 6. One Rescue and Safety motor boat having driver and expert swimmer and provided

	with additional 3 life jackets and Air tubes and Nylon ropes shall be stationed during working hours for emergency support. 7. One qualified Safety supervisor shall be stationed at site throughout the duration of works and activities associated with movement in water. He shall be equipped with binoculars for observation of activities in water and near shore. 8. For works involving under water operations employing diving equipment, a Technician or agency licensed for checking and certifying fitness of under water diving equipment shall be stationed for allowing the activity. **For more details please refer the attached installation manual of floater manufacturer (OEM).**
4.3	**Launching platform base Details (sequence work details for floaters assembly)** There will be 40 blocks of 2.5MW each of approximate size 32364m2. These platforms in appropriate blocks have to be assembled on the launching platforms at shore area and launched into reservoir and taken to their appropriate location as per Array layout. In case of split regarding positioning of floater platforms as per inverter rooms in an area, then vendors shall be allocated same based upon their launching platform base/s. Annexure-I.I &I.II is attached for more details.
4.4	**Series interconnection of SPV modules to form strings:** Type of module and rating: (Average 325Wp), Total quantity = 447700 Nos. (BHEL scope of supply), Bidder shall interconnect the SPV modules as follows: (a) Each module is fitted integrally with a junction box having positive and negative polarity cables (4 sq.mm). (b) Positive cable of one module shall be connected to the negative cable of next module. The cables have MC4 type of connectors. One polarity cable has male type connector, while the other has female type connector. (c) This way, 20 modules shall be connected in series. Each set of connections is called as a series string. **(**d) Thus, a total of 22385 strings shall be connected to achieve 145.5MWp.
4.5	**Interconnection of SPV module strings to 1Cx6sq.mm. cable:** (1) Vendor shall connect two series strings of 40(20+20) SPV modules to 1Cx6sqmm cable using **Y-connector.** (2) Required tools and tackles for crimping of cable etc. shall be arranged by bidder. This shall include crimping tool MC4, open end spanner set MC4, stripping plier MC4, socket wrench insert to tighten, socket wrench insert to secure, inserts for both 1Cx4 and 1Cx6 (of both pliers). (3) Extra quantity of Y Connector shall be procured for any damages / pilferage during the installation by vendor at site. Such additional quantities will not be paid for. Vendor shall ensure that there shall not be any shortage during execution time. The cable shall be neatly dressed and tied with UV resistant ties so as not to dangle and be in contact with water.
4.6	**Ferruling for 1Cx6sq.mm cable:** 1) For 1Cx6 sq.mm DC solar array cable, bidder shall provide UV resistant ferrules printed with **source / destination** identification of cable. Printing details shall be submitted for **BHEL / NTPC** approval during detailed engineering. Printing shall be of appropriate size to ensure readability. 2) Supply of ferrule shall be in bidder scope. 3) Ferrules shall be provided on both the termination ends: module end and SCB end.
4.7	**Installation of SCBs on floating pontoons**: (1) Supply of string monitoring boxes (SCB), 560 sets, is in BHEL scope. These are 22-in / 1-out type. (2) Bidder shall install the SCBs using suitable fixing mechanism of SCB support structure which shall be suitably mounted on HDPE floating pontoons. Supply of SCB support structure is under bidder scope. Provision will be provided in the pontoon to mount the SCB structure. However, necessary hardware like nuts, bolts, washers etc. shall be in the bidder scope of

	supply. Bidder shall arrange for fabricating the SCB mounting frame suitable for attaching to the floaters and mounting the SCB . The proto shall be demonstrated at site and approved before taking up bulk manufacturing. The frame material shall be of anodized or powder coated aluminium sections and SS 304 hardware. (3) All necessary labours, tools, machinery etc. for erection works shall be in bidder scope.
4.8	**<u>Routing of 1Cx 6sq.mm cable up to SCB:</u>** (1) Cable from the farther end of the string shall be routed below the module till other end. From that point both positive and negative cables shall be neatly routed through HDPE pipe using necessary water tight joints **till SCB input side**. **The HDPE pipes for routing cables are only required in pathways where SCBs are mounted.** Each row HDPE pipes are not envisaged. After completing the cabling and terminations at both sides, bidder shall seal the HDPE pipes with non-inflammable foam filling or any other reliable method using reputed makes for water sealing. The HDPE pipes shall be tied neatly to the pontoon lips at regular intervals. (2) HDPE DWC pipe together with necessary HDPE couplers/ joints (T-joints, elbows, bends etc.), UV resistant Cable ties, shall be within scope of bidder supply. **<u>Specification:</u>** As per relevant IS; ID (Internal Diameter) shall be selected to accommodate the number of 1Cx6sq.mm cables to be guided. ID shall be minimum 63mm. However, exact ID shall be selected to ensure that only a maximum of 60% of the ID space is occupied by the cables. Make, part number, sizes/ dimensions shall be submitted for **BHEL/NTPC** approval during detailed engineering. (3) Cable ties shall be in bidder scope of supply. Width of the cable ties shall be min 4.5 mm. (4) Cable ties, nylon polyamide 6.6 UV stabilized black, UL94 flammability rating V2, operating temperature up to 85 deg C, shall be used to arrest any possibility of movement or sagging. **Cable ties shall be of make: 3M**, **Phoenix contact, Weidmuller, Hellermanntyton, Panduit or other reputed equivalent, subject to BHEL/NTPC approval.** Width and Length shall be so appropriate as to ensure that the bunched cables are held firmly to the mounting structure. During detailed engineering, **BHEL/NTPC approval shall be obtained for the selected brand and sizes of cable tie.** (5) Spacing between two adjacent cable ties shall be so appropriate as to ensure that there is no loose hanging of cables and no contact with water.
4.9	**<u>Termination of 1Cx6sq.mm. Copper cables on input side of SCBs:</u>** (1) 1Cx6sq.mm cables of positive and negative polarities originating from SPV module strings shall be terminated at the input side of SCBs using MC4 connectors. (2) Bidder scope includes removal of sleeve of cable, crimping at the cable end and fixed with MC4 connector to SCB. (3) MC4 connector for 6sqmm cable termination to SCB shall be in BHEL scope of supply (4) Any other hardware, if necessary for fulfilling the connection, such as bolts, nuts, screws, washers etc. shall be in bidder scope of supply. **All hardware shall be of SS304.** (5) All necessary tools such as pliers, strippers, MC4 crimping tools etc. shall be within bidder scope. (6) After cable termination, all the cable entry points shall be sealed from outside using non inflammable foam or any other reputed proven weather resistant water sealing mechanisms to avoid water ingress.
4.10	**<u>Specification of ESE type LAs</u>** ESE type LAs shall be supplied as per attached specification PS-439-ESE LA as an **Annexure-II**
4.11	**<u>Installation of earthing electrodes on resevoir bed and interconnection to earthing grid</u>** Bidder shall make arrangements to carry out under water drilling on the reservoir bottom to insert the required number of electrodes into ground. Drilling mechanism mounted in boat or by under water equipment shall be used to place earth electrodes at locations marked by BHEL and to connect the earthing conductors from any floating platform to the electrode terminal securely. Required SS 304 hardware, Cable clamp/lug for fastening the conductor with terminal shall be supplied by bidder after finalizing method for permanent connection.

4.12	**<u>Earthing of solar PV modules and SCBs:</u>** The solar PV modules and SCBs installed by the bidder shall be provided with appropriate earthing for protection against faults as guided by IEC 60364. Bidder shall use min 2.5 sq.mm earthing copper cable (Yellow Green PVC sheathed) for connecting 20 modules in a row. Similar 22385 Nos of rows shall be directly connected to earthing strip from both sides of row. Same earth strip shall be used for SCB earthing also. Suitable size of cable (2 loops) shall be used for SCB earthing connection to strip. The size of earth strip shall be minimum 25 x 3 mm GS flat. **Bidder shall submit for approval detailed earthing plan with earthing cable sizing and break proof methodology for linking solar PV modules and SCBs earthing**. Supply and laying of earth strip is under bidder scope.
4.13	**Supply of Water washing system for SPV modules (Module cleaning system)** • Vendor shall supply 10 nos of water washing system with Pressure pump (AC/DC motor) for drawing water from below the floater and providing water jet to clean the PV modules. Pump motor shall be operated with either diesel or Petrol or Battery. • The pump set shall be complete with nozzle and flexible hose of atleast 20 m length and with flexible power cable of sufficient length in case of AC motor. • The pump shall be capable of providing water jet of atleast 2 kg/sqcm pressure to clean the PV modules in two to four adjacent rows at a time. Refer the PV array layout provided to view the Module arrangement.
4.14	**SPV module wash for Three cycles only.** Bidder shall wash the SPV modules with the help of supplied Pressure pump (AC/DC motor) once in a month. He has to carry out this activity for three cycles i.e three months.
4.15	**Identification marking of electrical items using paint** Following items shall be identified by way of artistic painting in black letters with yellow background. For danger symbol/text, white letters in red background. Identification number/ text to be painted shall be submitted for BHEL/NTPC approval during detailed engineering for the following. (1) String monitoring boxes: 565 Nos (2) Size/ source/ destination of DC cable 1Cx400 with arrow mark (power flow direction) to be painted on SCBs and PCUs (3) PCUs front side: PCU ID number (1 to 40) with rating 2500kW, AC chamber/ DC chamber, Danger text/symbol. (4) PCUs DC chamber back side: SCB ID numbers, cable size (1Cx400 +,-) with upward arrow mark, danger text/symbol (5) PCUs AC chamber back side: Inverter Transformer ID, cable size (10Rx1Cx400 / ph) with downward arrow mark, danger text/symbol (6) Same way as above, the corresponding panel ID with rating, cable destination with arrow mark in power flow direction, danger text/symbol shall be painted for all VCB panels, Inverter transformers (HV and LV sides), Aux transformer (HV and LV sides), LT SWITCHGEAR panel. (7) For UPS/ FCBC/ SCADA/ ABT metering panels, C&R panel, all DB boards/ fire alarm panels, ID number shall be painted. Cable size/ destination/ arrow marks not required to be painted as cable tags shall be adequate. (8) For earth chambers of main control room ID number shall be painted. (9) All switchboards shall be painted with ID number.

4.16	**Cable markers and cables tags** (1) Cable markers and joint markers for underground cables shall be provided along the route of the cables as per section "**Cable installation methodology**" of this specification. (2) Cable tags shall be provided at either of the cable (at the entry point to the panel / equipment to which it is connected / terminated) shall be provided as per section "**Cable installation methodology**" of this specification. (3) Bidder shall submit the respective schemes of marking and tagging for BHEL/NTPC approval during detailed engineering.
4.17	**Tool kits and instruments :** The bidder shall keep ready stock of tools, tackles and essential spares that will be needed for the day-to-day maintenance of the solar PV system. This shall include but not be limited to the following: a) Screw driver and / or Allen key suitable for the connectors, power distribution blocks, Circuit breaker terminals and surge arrestor terminals. b) Spanners / box spanners suitable for the removal of solar PV modules from the solar PV module support structure. Cleaning tools for the cleaning of the solar PV modules. Spare fuses. c) Panel efficiency measurement tools d) Digital multimeter- 2 Nos e) AC/DC clamp meter – 2 Nos f) Meggering kit (5 KV) – 1 No. g) Cable crimping tool – 1 no. 4/6/10 sq.mm and 1 no. 240-630 sq.mm (hydraulic type) h) Rechargeable LED type water proof Flash lights – 10 nos. Note: Make / model number etc shall be approved by BHEL/NTPC prior to procurement.
4.18	**Cable installation Methodology** **Cable Terminations & Connections** a) The termination and connection of cables shall be done strictly in accordance with cable termination kit manufacturer'' instructions, drawings and/or as directed by Project Manager. Cable jointer shall be qualified to carryout satisfactory cable jointing/termination. Contractor shall furnish for review documentary evidence/experience reports of the jointers to be deployed at site. b) Work shall include all clamps, fittings etc. and clamping, fitting, fixing, plumbing, soldering, drilling, cutting, taping, preparation of cable end, crimping of lug, insulated sleeving over control cable lugs, heat shrinking (where applicable), connecting to cable terminal, shorting and grounding as required to complete the job to the satisfaction of the Project Manager. c) The equipment will be generally provided with undrilled gland plates for cables/conduit entry. The Contractor shall be responsible for punching of gland plates, painting and touching up. Holes shall not be made by gas cutting. The holes shall be true in shape. All cable entry points shall be sealed and made vermin and dust proof. Unused openings shall be effectively sealed by 2mm thick aluminium sheets. d) Control cable cores entering control panel/switchgear/MCC/miscellaneous panels shall be neatly bunched, clamped and tied with self-locking type nylon cable ties with de interlocking facility to keep them in position. e) All the cores of the control cable to be terminated shall have identification by providing ferrules at either end of the core, each ferrule shall be indelible, printed single tube ferrule and shall include the complete wire number and TB number as per the drawings. The ferrule shall fit tightly on the core. Spare cores shall have similar ferrules with suffix sp1,

	sp2, -etc along with cable numbers and coiled up after end sealing. f) All cable terminations shall be appropriately tightened to ensure secure and reliable connections.
4.19	**Pre-commissioning inspections/ checks/tests:** **Bidder shall be responsible for carrying out following activities** **A) Basic checks** A1 Tightness checks: 1) Terminations of DC power cables at SCBs, 2) Terminations of earthing to all modules and SCBs A2 Electrical continuity checks

5.0 General conditions applicable during installation and commissioning phase

5.1	Bidder shall arrange sufficient water safety equipments for floater installation like safety jackets, nylon ropes, buoys, inflatable rafts, air tubes. Sufficient no. of motorized boats with drivers for movement in water and towing works, safety operation, etc.
5.2	Bidder to source items as per NTPC approved vendor list as applicable.
5.3	All machinery such as cranes, hydra, JCBs, forklifts, transport trucks, trolleys etc necessary for movement and installation of materials / panels / equipment etc shall be organized by the bidder.
5.4	All necessary tools and tackles such as crimping tool ,screw driver set, power screw drivers, cutting pliers, nose pliers, spanner sets, adjustable spanners, hole-saw cutter set, bending tools, torque wrenches, hack saw blades, pipe wrenches, flat / round files, HV termination tools, drilling machines, welding machines, concrete mixers, steel bar bending tools / templates/ shuttering materials for RCC works, spade, shovel, hammer etc shall be organized by the bidder.
5.5	All necessary measuring instruments such as digital multimeters, measuring tapes, vernier calipers, electrical testers, digital meggers (1kV, 2.5kV, 5kV), earth resistance meters, clamp meters, transformer oil BDV kit, relay testing kit (secondary injection), primary injection kit, infrared thermal imaging handheld temperature meter etc. All these instruments shall possess valid calibration certificate issued from approved NABL laboratory.
5.6	Bidder shall make their own arrangements for necessary food, drinking water and accommodation for their labour and employees posted at the site. Similarly, food and drinking water required at the site, during the construction operations, shall also be in scope of bidder.
5.7	Bidder shall organize all necessary steps to meet statutory requirements such as labour license, PF, ESI etc and also ensure compliance with relevant acts such as minimum wages act/wage code, income tax act, employee insurance act etc for their labour deployed at site. Also workmen employed shall be registered with NTPC's CLIMS system (biometric) for movement control at Power plant site as applicable.
5.8	Bidder shall maintain updated labour register, with name, age, qualification, salary, attendance details etc. at the site.
5.9	Bidder shall use danger boards, wherever required, to ensure safety of the persons during the work at site.
5.10	Bidder shall adhere to all necessary safety norms such as use of helmet, goggles, hand gloves, gumboots, aprons, approved life jackets etc. It is the ultimate responsibility of the bidder in all respect to prevent accidents at the site and safeguard their labour from accidents.
5.11	Bidder shall, at the completion of every work, clear off the debris, which resulted out of the work. In case of excavation work such as cable trench etc, bidder shall finish the land neatly with necessary leveling, rolling etc.
5.12	Bidder shall carry out the work without causing inconvenience to other contract groups at the site. In case of conflicts with other groups, bidder shall ensure that the matter is resolved at once amicably so that the progress of work is not affected
5.13	Any damages on the building, structures etc. attributable to the acts of labour / employees of bidder shall be rectified and made good by the bidder at their own cost.

5.14	No child labour shall be employed for execution of the present contract.
5.15	Any miscellaneous materials, which are found essential for technical completion of the contract but not mentioned explicitly in this specification, shall be deemed to be included in the specification. Accordingly, such materials shall be included by the bidder as part of the offer.
5.16	Special instruction for earthing: In compliance with Rule 33 and 61 of Indian Electricity Rules, 1956 (as amended up to date), all non-current carrying metal parts shall be earthed with two separate and distinct earth continuity conductors to an efficient earth electrode. Accordingly, all cases such as cable support structures, cable ladders, cable trays (control room) etc. shall be earthed.
5.17	BHEL/NTPC shall witness routine/ acceptance/ type tests performed at manufacturer works for the items supplied by bidder. Bidder shall accordingly provide inspection call to BHEL with submission of quality assurance plan in advance. For the items bought out from dealers, test certificates, as per relevant IS / IEC standards, as issued by manufacturer shall be submitted to BHEL. However, prior approval shall be obtained from BHEL/NTPC for procurement of the item from dealers.
5.18	Field Quality Plan / Quality control system (if applicable) Bidder shall set up a field quality control laboratory with full set up to facilitate testing of all construction materials in accordance with FQP (Field quality control plan) as approved by BHEL/NTPC. Bidder shall deploy a well experienced quality control engineer to monitor all QC activities at site as per approved FQP. Specifically, with reference to civil works, bidder shall submit all concrete mix designs and bituminous mix designs for BHEL/NTPC approval before starting of the work. All the third party testing should be conducted in NABL approved laboratories only. Bidder shall submit the FQP for the civil construction works before starting of the works for approval of BHEL/NTPC.
5.19	Any deviations shall be discussed with BHEL/NTPC site engineers and implementation shall be taken up only after approval from BHEL /NTPC
5.20	Bidder shall submit periodic status report, on daily as well as weekly consolidated basis, to BHEL on the progress of the contract.
5.21	Bidder shall, as and when required by BHEL/NTPC, participate in the review meetings conducted by BHEL/NTPC at project site, BHEL-EDN (Bangalore), BHEL-Corporate office (New Delhi), NTPC office (Ramagundam) etc.
5.22	**General Guidelines** a) Any civil or electrical work which is not mentioned or included in this tender document but necessary for functional requirements of the plant shall be carried out by bidder. b) Bidder shall prepare all designs / drawings based on the specifications given in the tender and in light of relevant BIS/IS/ equivalent standard. c) Bidder shall provide type test reports (as applicable) and datasheet/ GTP for all equipment covered under bidder scope of supply. d) BHEL reserves right to modify the design at any stage to meet local site conditions / project requirements. e) All work shall be carried out in accordance with the latest edition of the Indian Electricity Act and rules formed thereunder and as amended from time to time.

6.0 Documents to be submitted for BHEL/NTPC approval during detailed engineering

6.1	BHEL / NTPC approval shall be obtained for the following technical documents, which shall be submitted to BHEL in phased manner based on priority sequence of activities during detailed engineering (after receipt of purchase order from BHEL).
6.2	Name of bidder/ make, model number/ part number, specification/ sizes/ dimensions/ drawings/ datasheets shall be submitted for approval to BHEL / NTPC for the items which cases bidders name is not mentioned.
6.3	Design calculations/ general arrangement drawings/ single line diagrams/ GTP particulars/ datasheets/ schemes/ layouts/ bill of materials etc., as applicable, shall be submitted for the following: 1. HDPE DWC conduits, cable glands, cable lugs, cable ties and earthing cable.

	2. General arrangement and detailed drawings with bill of materials of the overall lightning arrestor arrangement, Installation manual for LA-ESE and earthing, Lightning arrestor protection coverage area calculations 3. Any other designs/ schemes/ layouts etc as applicable as per BHEL / NTPC requirements that will be discussed during detailed engineering.
6.4	Manufacturing Quality Plans for all the bidder supplied items
6.5	Field quality plan for the field work: civil works, electrical works
6.6	Detailed activity-time chart for project implementation
6.7	Detailed manpower deployment schedule
6.8	Operation and maintenance manuals of bidder supplied items.

7.0 BHEL Safety plan for 100 MW FSPV project NTPC RAMAGUNDAM

The purpose of this Safety Plan is to provide for the systematic identification, evaluation, prevention and control of general workplace hazards, specific job hazards, potential hazards and environmental impacts that may arise from foreseeable conditions during execution of the 100 MW Floating Solar Project. Details instruction and guideline is attached in separate enclosure as Annexure-III.

8.0 Safety Documents to be submitted for BHEL/ NTPC approval during I&C

a) Safety Check list cum compliance report

b) Inspection of First Aid Box

c) Safety Induction Training

d) Monthly Site Safety Report

e) Work permit

f) Inspection on Electrical installation

g) Details of qualified Safety Supervisor posted at site on duty

Note- Format of all documents shall be provided after work order.

9.0 Enclosures to this tender specification (Tender purpose only):

1	AC single line diagram of overall Solar PV power plant
2	Tentative array layout with SCB locations
3	SPV module drawing
4	Earthing system specification
5	ESE Lightning Arrester specification
6	Floater installation manual
7	Site key plan with ESE LA locations
8	Safety plan guidelines

10. Location/ address of power plant:

100 MW (AC) Floating Solar PV Project,
NTPC Ramagundam,
Peddapelli District,
Telangana - 505215

Prabh Dayal Om Parkash Infrastructure Limited

Confidential

INSTALLATION MANUAL

Contents

Site preparatory works

Project implementation begins with site preparation, when the EPC contractor starts building access roads for equipment delivery, clears the site, and removes objects that might impede construction. Usually all the activities related to site clearance, landfill, evacuation, and debris removal is done during this phase. In addition, the EPC contractor establishes site security and a security office and erects fencing and gates

Delivery of materials and storage

Floats can be unpacked and stored at the launching site with a sufficiently large staging area. Electrical equipment like inverters, LV switchboards, and transformers should be stored indoors or under a canopy to protect them from dust or rain until their deployment.

Reference Image: Source: Where Water Meets Sun – World Bank

Preparation of launching area

Before construction begins, identify a suitable launching area by the water body with a gentle slope. This important supporting infrastructure is where the floating structure is assembled and launched. In general, working on land is easier than assembling the components directly on water. The launching area always needs some preparation. A launch ramp can be constructed on the bank's natural slope into the water body. This temporary infrastructure could be built with metal or wooden scaffolding and slats at minimal investment. Although not mandatory in all cases, a launch ramp can ease deployment efforts and reduce float damages; hence, it is highly recommended. Workers can gently push the assembled floats into the water, so lifting machinery is not necessary.

Reference Image: Source: Where Water Meets Sun – World Bank

Reference Image: Source: Where Water Meets Sun – World Bank

Assembly of floating structures

Once the materials are delivered onsite, the assembly work of the floating structure commences. Assembly is usually done as smaller single blocks of floating units. Single units are assembled first by multiple teams of workers. The construction varies depending on the floating structure design.

The following steps are carried out for the construction of a single block of floating units:

• Layup of floating component

• Assembly of floats together and interconnection of floats, where relevant

• Assembly of module support structures

• Installation of modules Once assembled, the single units are linked together

• Connection of wires to the modules and ready for connection with combiner box

• **After a few units are linked, the entire row is pushed**

Subsequent rows are built and launched until the floating island is completed

The next steps of construction could be outlined as:

• Interconnection of single units/block to a larger row

• Electrical interconnection as per the design

• Launching or sliding into water

• Towing to designated position

• Mooring and anchoring Upon completion, the entire FPV island is towed to its final location by motor boat The system is ready for mooring and anchoring.

Safety considerations

▲ Workers should undergo Mandatory Basic Safety Training for land-based construction work

▲ Job specific safety training and regular refresher training should be provided to workers to enhance/maintain their safety awareness of potential hazards associated with work over water/near water, including those during inclement weather.

▲ Specific safety training should be provided to workers on the use and checking procedures of life jackets, and rescue arrangements for persons who fell into water.

▲ Supervisors/workers should be trained on emergency and evacuation procedures, including the conduct of regular drills, in respect of work over water/near water.

Assembly View

Below is a reference picture of a small floating array. The image highlights the various floats that are combined together to form the floating structure. This installation manual guides the user step by step on how to connect the different floating pontoons to form a bigger array.

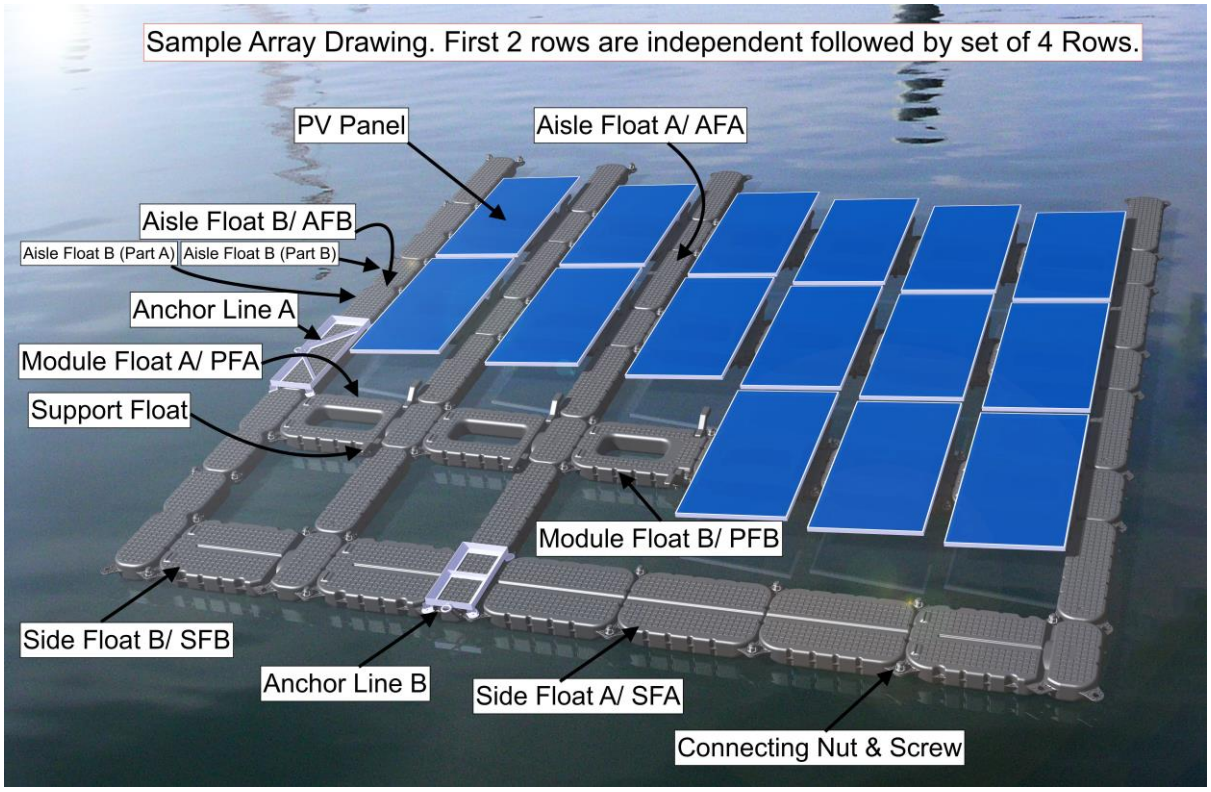
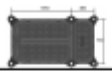


Image 1 : Source: Prabh Dayal Om Parkash Infra Ltd

2) Detailed Specification of Floats

The table below depicts the different type of floats and accessories. These components when joined together form an array (Refer to Image 1). The table highlights the dimensions and material of every item

II. Product information

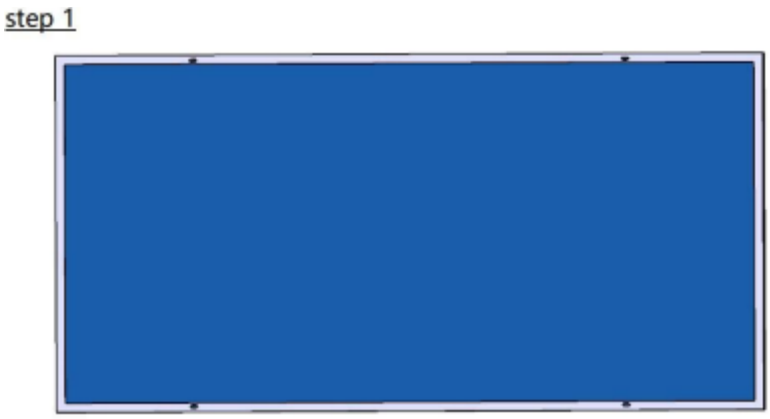
NO.	PIC	ITEM	Material	Dimension (mm)	unit
1		Aisle Float A	HDPE	1420×520×184	Pcs
2		Aisle Float B	HDPE	1520×520×184	Pcs
3		Side Float A	HDPE	1570×870×200	Pcs
4		Side Float B	HDPE	1270×870×200	Pcs
5		Panel Float A	HDPE	1570×870×200	Pcs
6		panel Float B	HDPE	1270×870×200	Pcs
7		Support Float	HDPE	365×232×70	Pcs
8		Conneting Screw	HDPE	¢75×120	Pcs
9		Nuts	PE	¢78×38	Pcs
10		anchorline A	Q235b+HDG	950×520×150	Set
11		anchorline B	Q235b+HDG	1400×580×150	Set

3) Installation Steps

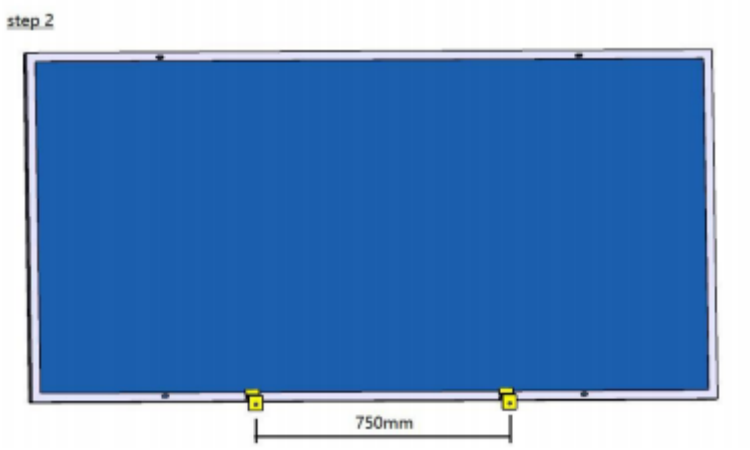
The installation of the floating pontoons requires ample space and a clear area. Please refer to the preparation of launch area and site preparatory work. Before beginning installation, the contractor should ensure they have a spacious area more than 2000m2 for assembly near the site.

Please follow the steps below for installation

Step 1) Place the photovoltaic module on a flat surface

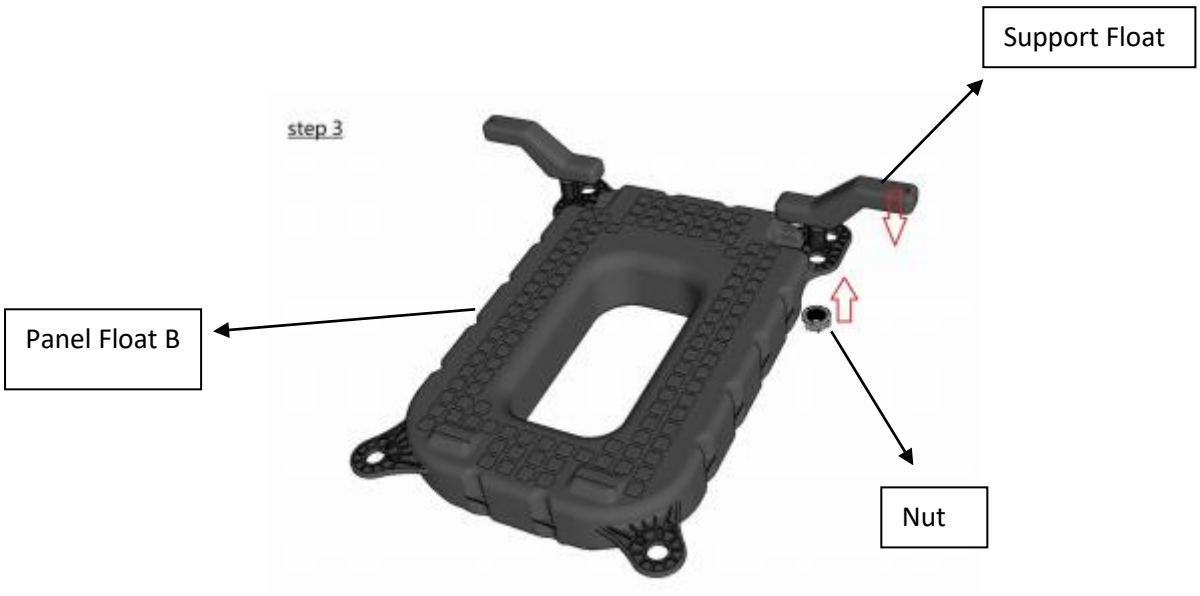


Step 2) Install two clamp（with SS screw) at specific position keeping distance of 750mm on the back face of the panel

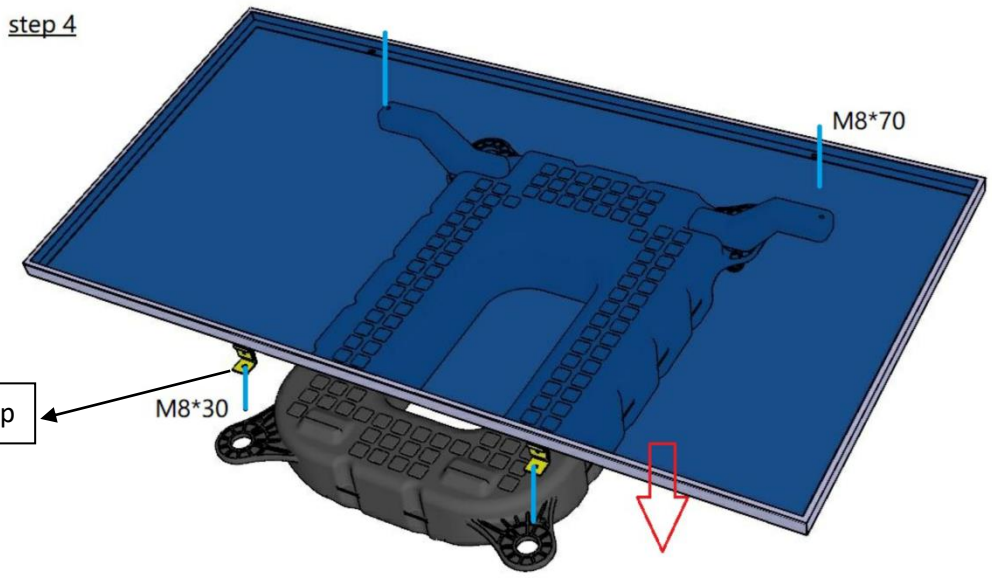


Step 3) Connect a Support float on panel float B on each side and Fasten Nuts under lugs

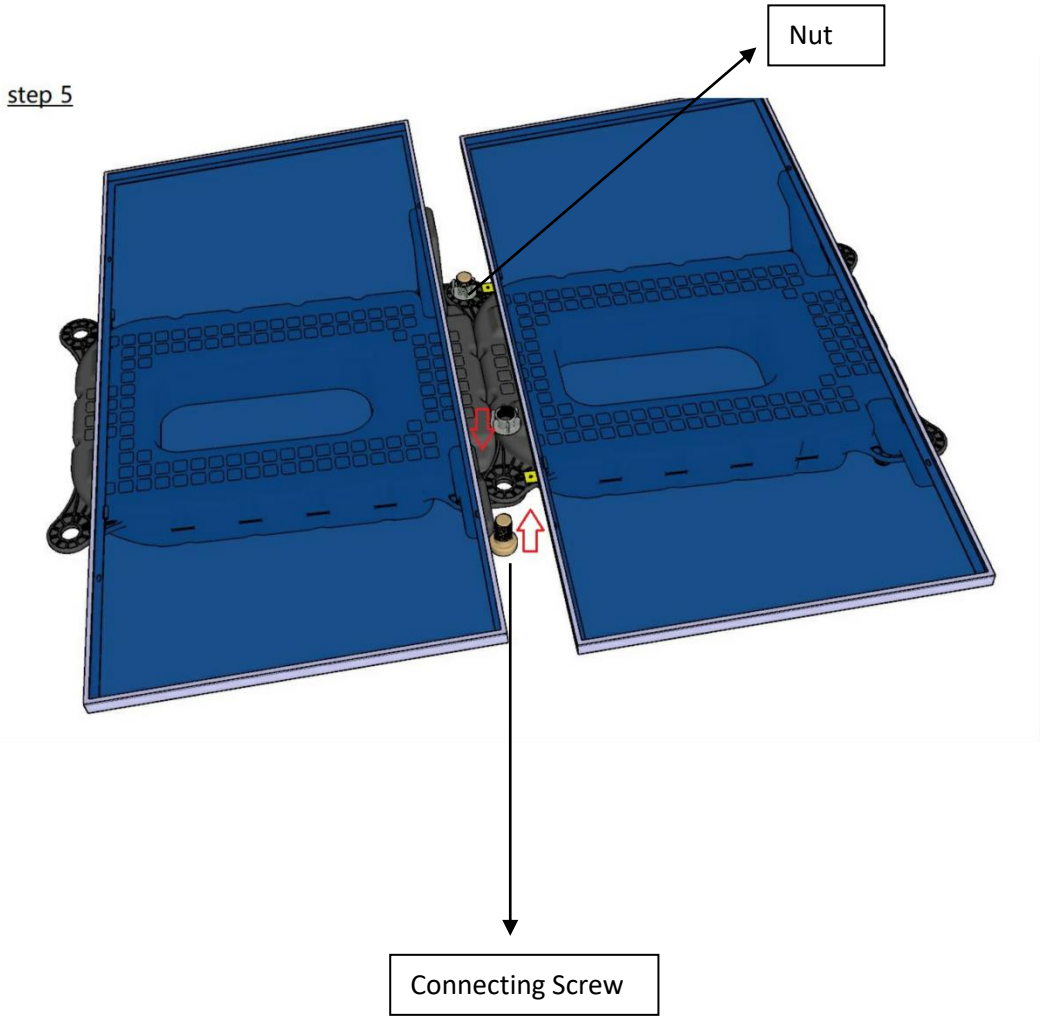
Refer to the image below



Step 4) Lift the photovoltaic module and place it on panel float B such that they perfectly align together on all fours points， next screw the module with stainless steel screw M8

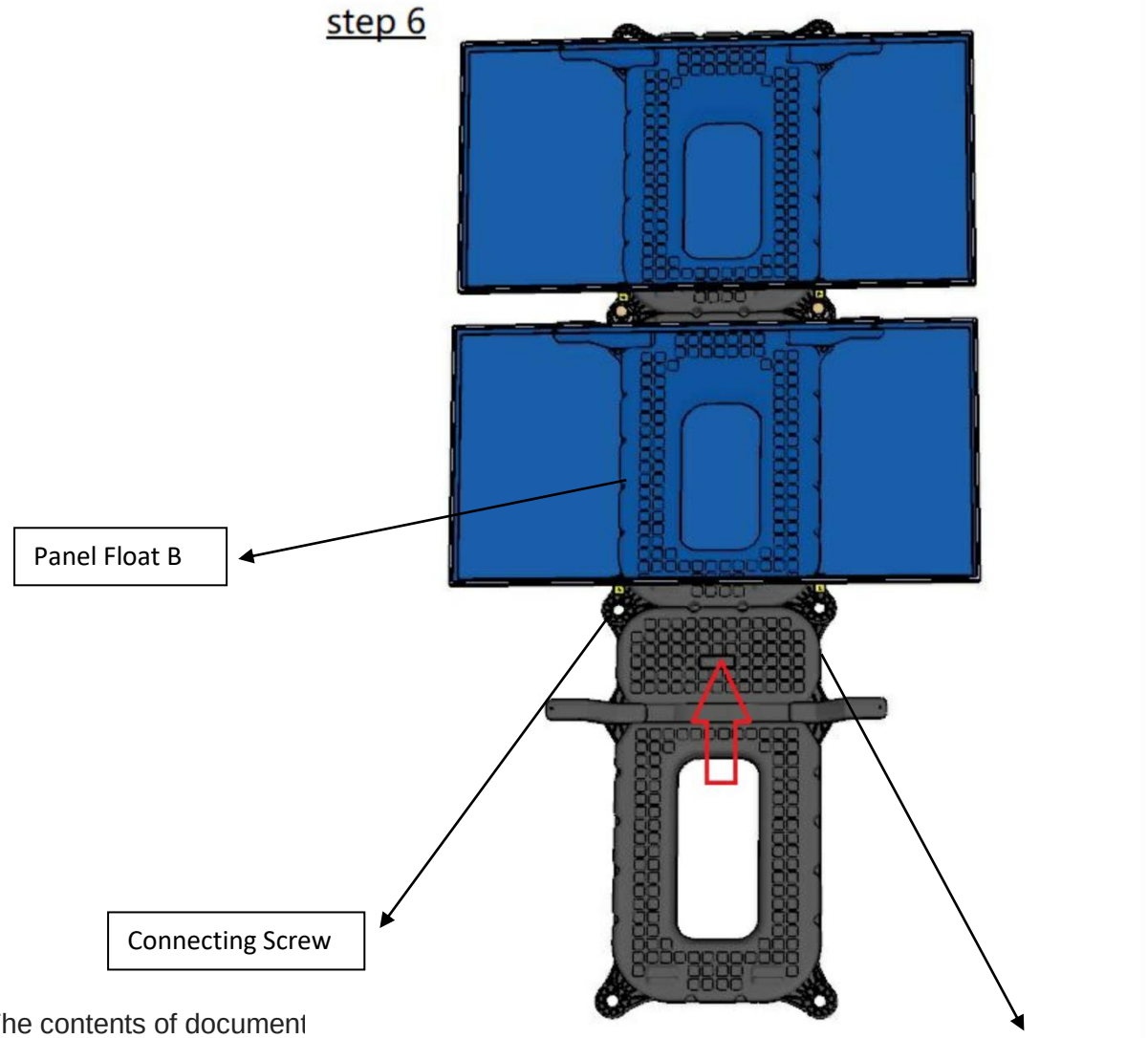


Step 5) Repeat the process to mount another module on panel float B and then using the connecting screw and nuts, join two panel float B on land

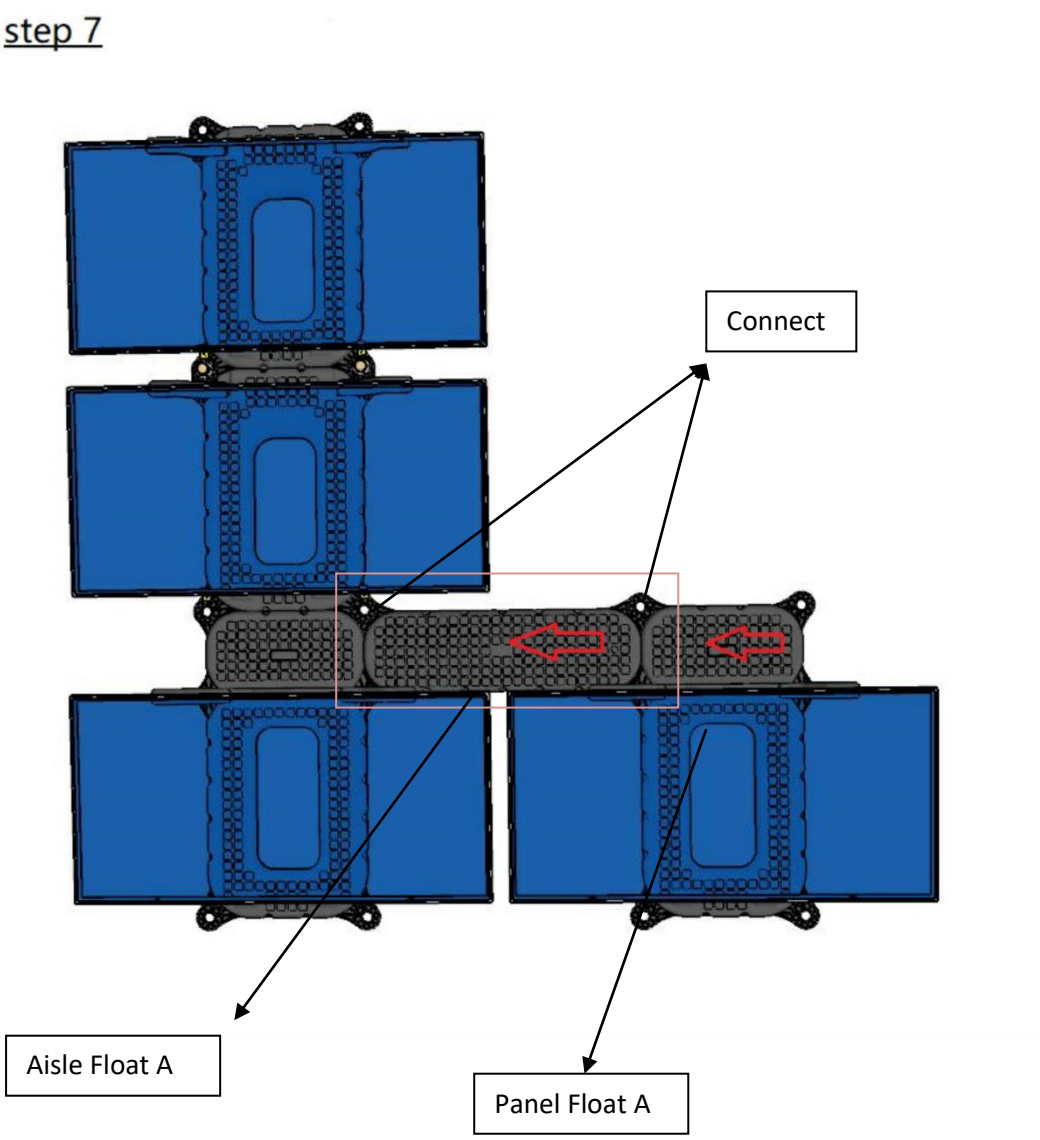


Step 6) Now, follow step 1-3 and mount a photovoltaic module on panel float A

After mounting a module on panel float A, connect panel float A to panel float B as below

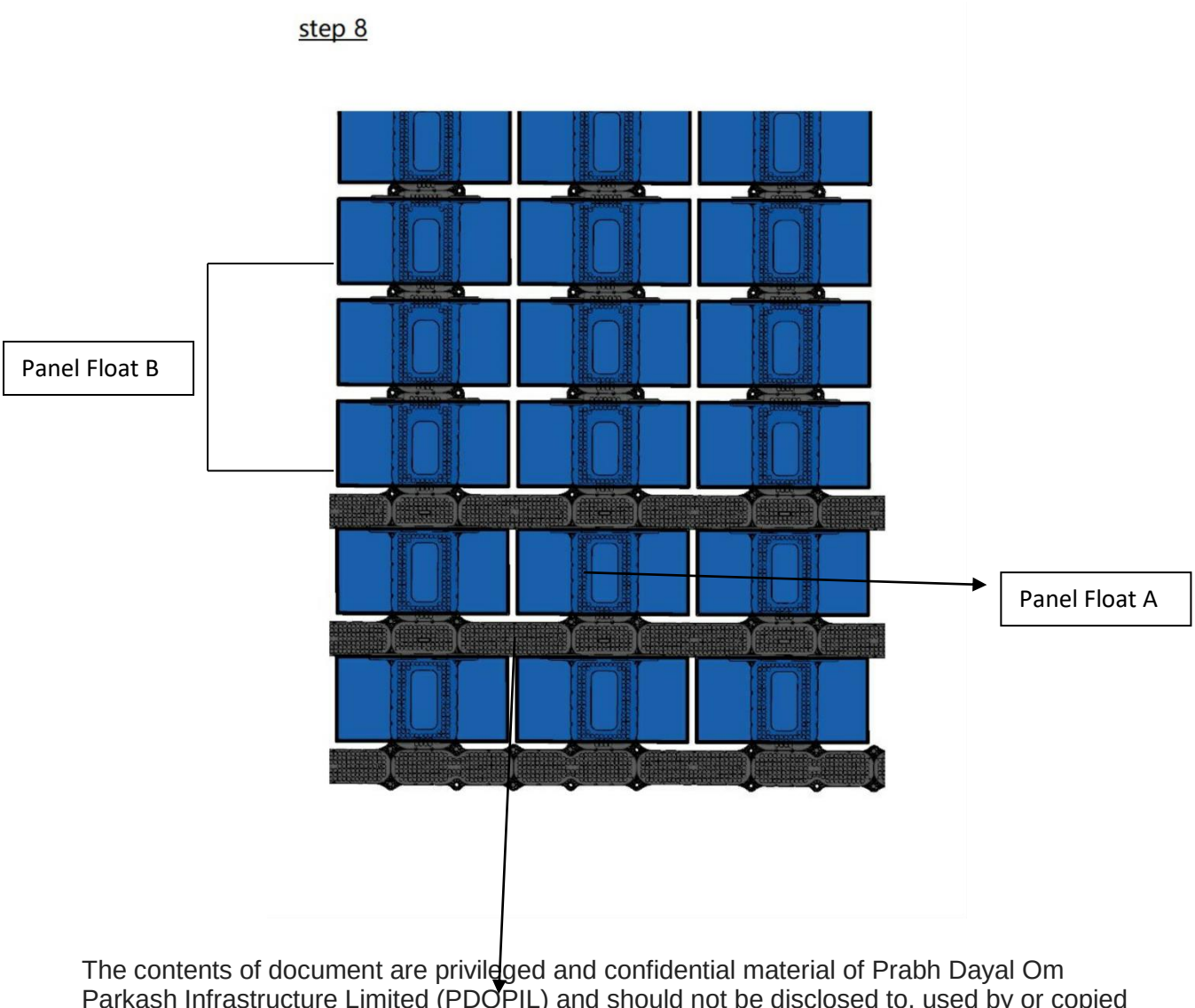


Step 7) After connecting Panel Float A with Panel Float B, Connect an Aisle Float A between two Panel Float A



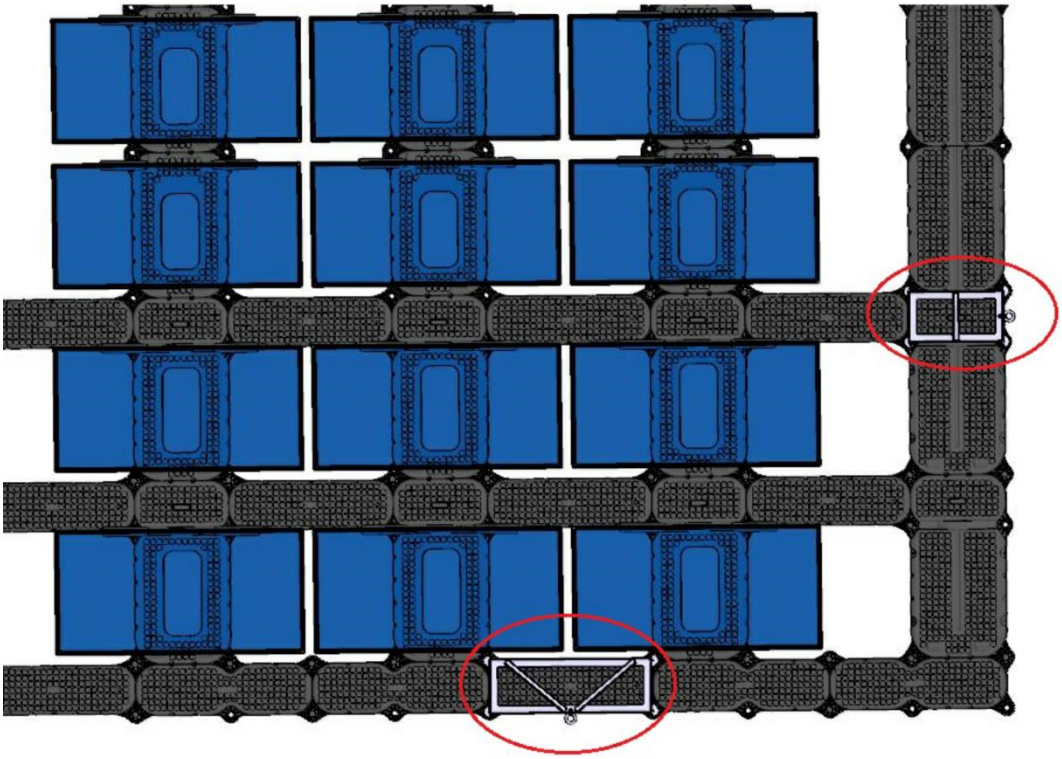
Step 8) The bottom of each array will have two rows with panel float A. After that, each row will have three rows of panel float B, followed by one row of panel float A. This procedure will be followed till the assembly reaches the top of array as per the drawing.

Repeat the steps above 1-7, and form an array as per the drawing. There should be four modules after every walkway. There should be three panel float B after every panel float A in vertical alignment. There should be one aisle float A between each panel float A in horizontal alignment. Refer to image below.



Step 9) Final step is installation of anchor line nuts as per drawing, We need to push float array into water gradually.

step 9



Reference Image: Source: Where Water Meets Sun – World Bank

Reference Image: Source: Where Water Meets Sun – World Bank

Reference Image: Source: Where Water Meets Sun – World Bank

ANNEXURE-VI

Float Installation Manual - Adtech Systems Ltd

ADTECH
SYSTEMS LIMITED

Version - 2 Date: 02nd December, 2019

Table of Contents

A. Float Specification:

1

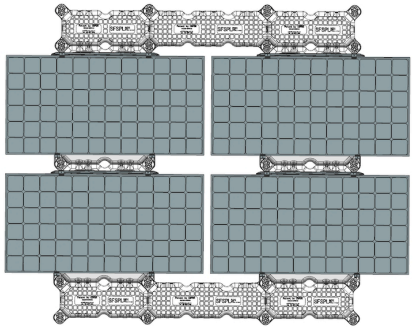
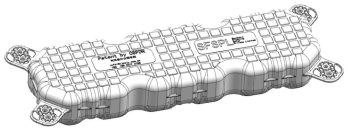
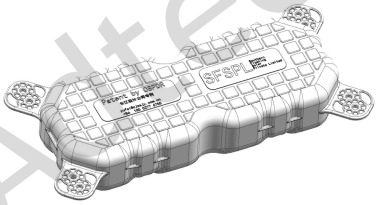
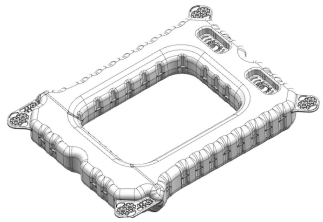


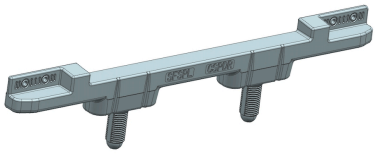
Figure 1

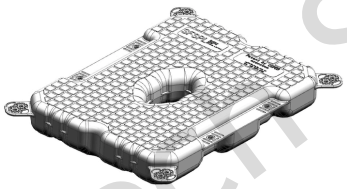
Big Walkway		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Average Wall Thickness (in mm)	3
	Design Weight (in kg)	4
	Max Use Buoyancy (in kg)	60
	Dimension (in mm)	As per approved drawing
	Manufacturing Process	Blow Molding
	Function	• Forms maintenance walkways • Non-Slippery Surface

Small Walkway		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Average Wall Thickness (in mm)	3
	Design Weight (in kg)	3
	Max Use Buoyancy (in kg)	45
	Dimension (in mm)	As per approved drawing
	Manufacturing Process	Blow Molding

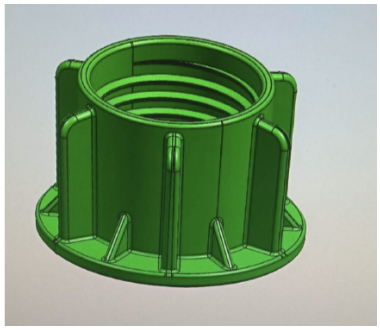
	Function	• Forms maintenance walkways • Non-Slippery Surface

Connecting Float		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Average Thickness	3mm
	Design Weight	7.5
	Max Design Buoyancy	82
	Dimension	As per approved drawing
	Manufacturing Process	Blow Molding
	Function	Give Support to the PV module

Support Piece		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Average Thickness	3mm
	Design Weight	1.2
	Design Buoyancy	-
	Dimension	As per approved drawing
	Manufacturing Process	Blow Molding
	Function	Give an Optimum degree 12 to the panel

Equipment Float		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Average Thickness	3mm
	Design Weight	8
	Design Buoyancy	130
	Dimension	As per approved drawing
	Manufacturing Process	Blow Molding
	Function	For the Cable arrangement and junction box location

Note - All dimensions and weights provided have a tolerance of +/- 5%

HDPE Nut		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Design Weight	55g
	Dimension	D80*50
	Manufacturing Process	Injection Molding
	Function	Holding the Support Float

Sleeve		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Design Weight	2g
	Dimension	D17*26
	Manufacturing Process	Injection Molding
	Function	Alignment of SS nut&bolt

HDPE Gasket		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Design Weight	29g
	Dimension	D85*14
	Manufacturing Process	Injection Molding
	Function	Spacer between the walkway.

Note - All dimensions and weights provided have a tolerance of +/- 5%

B. Panel Fixing Hardware:

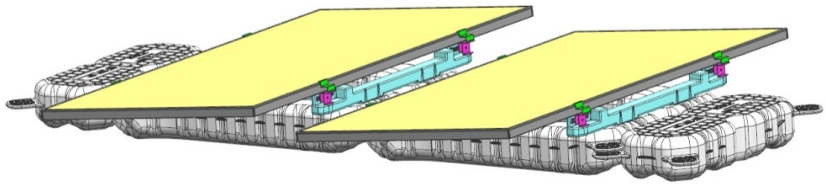
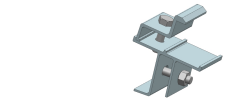
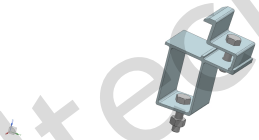


Figure 2

Upper clamp(Top Right and Left)		
	Raw material	Anodized Aluminum
	Count per panel	2 sets
	Technical Features	Length 50 mm Hole Ø9 mm
	Manufacturing Process	Aluminum Extrusion
	Function	Holding the Solar panels and it is connected to the “L” profile of the Support float

Lower clamp(Bottom Left and Right)		
	Raw material	Anodized Aluminum
	Technical Features	Length 50mm Hole Ø9 mm
	Count per Panel	2 sets
	Manufacturing Process	Aluminum Extrusion
	Function	Holding the Solar panels and it is connected to the “L” profile of the Connecting float

Nut ,Bolt and washer		
	Raw material	Stainless steel
	Count / module	Nut 8 Bolt 8 Plain Washer 16 Spring Washer 8

	Type	M8- SS 304
	Function	Holding the Solar panels and it is connected to the “L” profile of the Connecting float

C. Mooring clamps and Lines

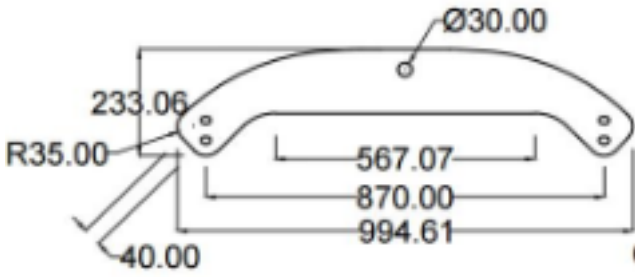


Figure 3

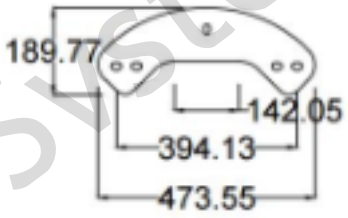


Figure 4

D. Tools and Tackles Required:

1. Injection Nut Wrench (drawing of Injection Nut can be provided on request)
2. M12 and M8 Nut Wrench
3. Drilling Machine

E. Instructions for Installation:

1. Solar Panel Installation:

The solar module is connected to the connecting float on the bottom side and support float on the top side. The panels are connected to the floats using Al. extruded clamps connected at the 4 designated points on the float using SS304 - M8 hardware.

The following are the components used for the connection:

A. L clamp (Bridge Clamp)
B. Upper Base Clamp
C. Lower Base Clamp
D. SS304 M8 - Nut, Bolt, Spring Washer and Plain Washer (2)

Installation Recommendations:

A. It is recommended to use a table for the module assembly on the float and to conduct the installation check for the same
B. Ensure the DC cables on the module are opened and loose before mounting the module on the float

Installation Procedure:

A. Place a rubber mat on top of the table
B. Place the Connecting Float on the rubber mat so that the portion where the Support Piece will be connected is exposed from the table
C. Connect the Support Piece on the Connecting Float and use the D80*50 nut to screw the Support Piece to the Connect Float (need to add torque info) (as shown)

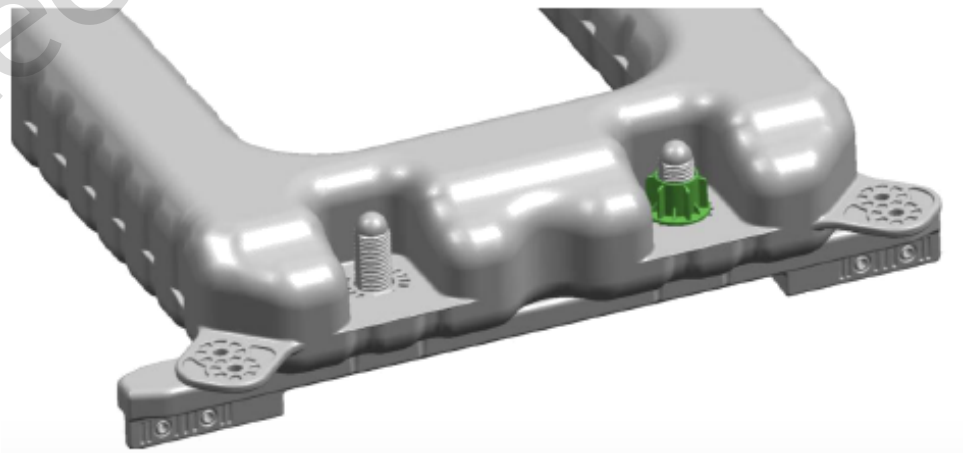


Figure 5

D. Connect the 2 Lower Base Clamps to the bottom of the Connecting Float (as shown) using SS304 M8

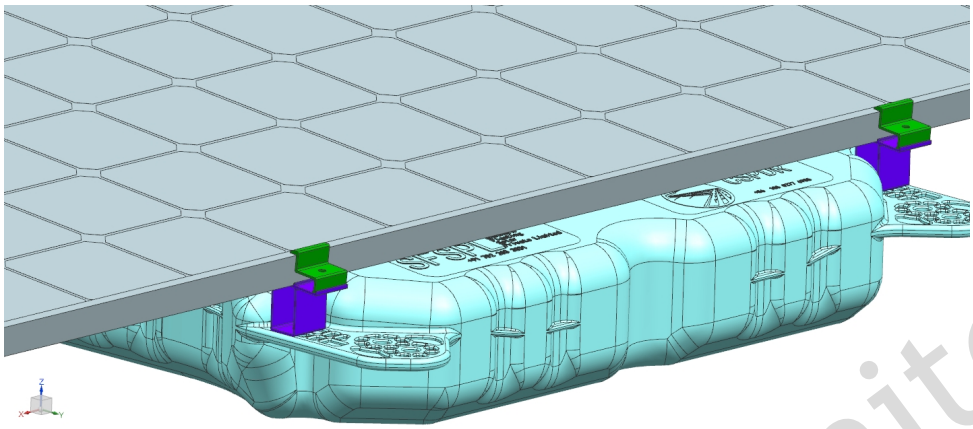


Figure 6

E. Connect the 2 Upper Base Clamps to the top of the Support Float (as shown) SS304 M8

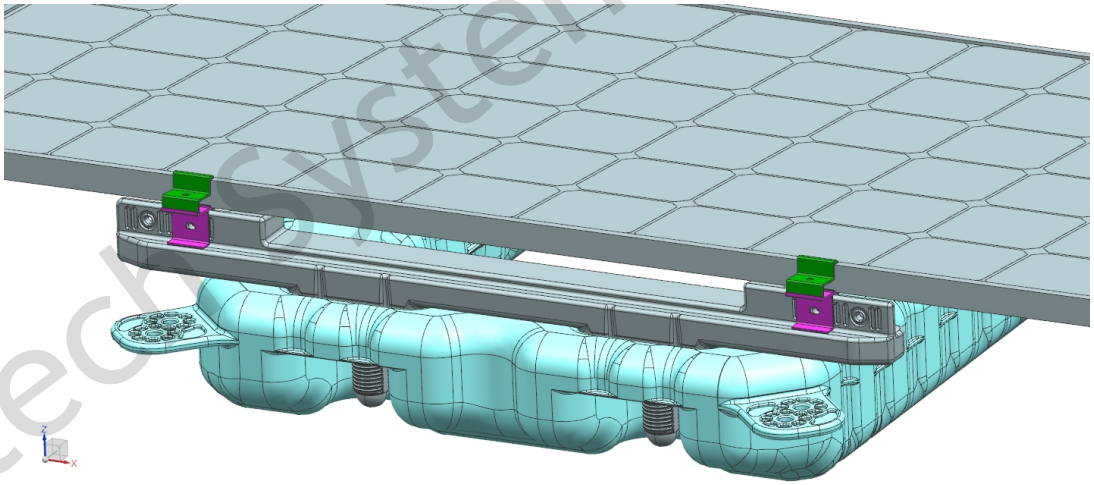


Figure 7

F. Connect the 4 L Clamp (Bridge Clamp) to the Lower Base Clamps and Upper Base Clamps loosely using SS304 M8
G. Take care to mount the panel on the float making sure that the midpoint of the panel is aligned with midpoint of the Connecting Float
H. Tighten the M8 fasters on the L Clamp after placing the module to ensure the module is tightened (mention torque)

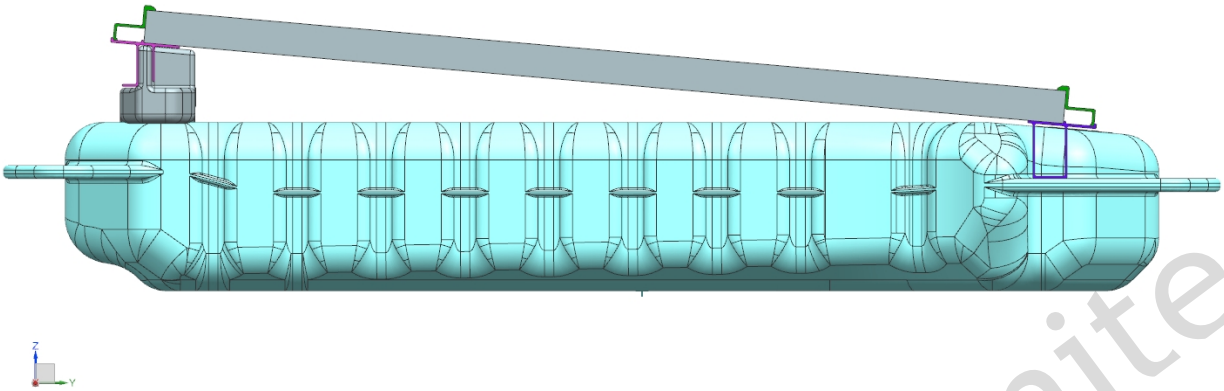


Figure 8

2. **Float Interconnection:**

Typically our floating structures are designed to have one row of Walkways at the periphery on the top and bottom portion and columns of Equipment Float at the periphery on the left and the right of the floating solar system. The Connecting Floats are installed inside the peripheral layers.

The following are the components used:

A. Connecting Float (CF)
B. Equipment Float (EF)
C. Small Walkway Float (SWF)
D. Big Walkway Float (BWF)
E. Support Piece (SP)
F. SS304 M12 - Nut, Bolt, Spring Washer and Plain Washer (2)

Installation Recommendations:

A. Ensure sufficient quantity of all floats are available to complete the portion of the total floating system which you wish to assemble

B. Ensure sufficient quantity of fasteners, sleeves and gaskets are available to complete the portion of the total floating system which you wish to assemble

C. Ensure that anchoring spreader bar is connected correctly to the outer peripheral floats before pushing into the water

D. Start the assembly from the last row onwards to ensure ease of installation while pushing into the water
E. While pushing the floats into the water, ensure not to exert excessive force on the ears of the float which may damage the same

F. Split the total assembly into sections and complete each section on the ground and then connect the completed sections together in the water to ensure proper connectivity. We recommend connecting 2-3 rows at any point of time on the shore and tugging a maximum of 5 rows by connecting both ends to ropes connected to the tug boat (say with a 10 HP motor)

G. Create a smooth surface at an angle of approximately 20 degree to help sliding the connected floats into the water. The platform should be lined with smooth plates or rubber sheets to avoid scratching of the floats with the ground

H. Use the logo on the floats as well as orientation marking on each float to ensure the correct orientation of the floats is followed during interconnection of the same

Float Installation Procedure:

A. Check the design of each float to see the height differences of the ears marked on the side of each float (as marked in orange)

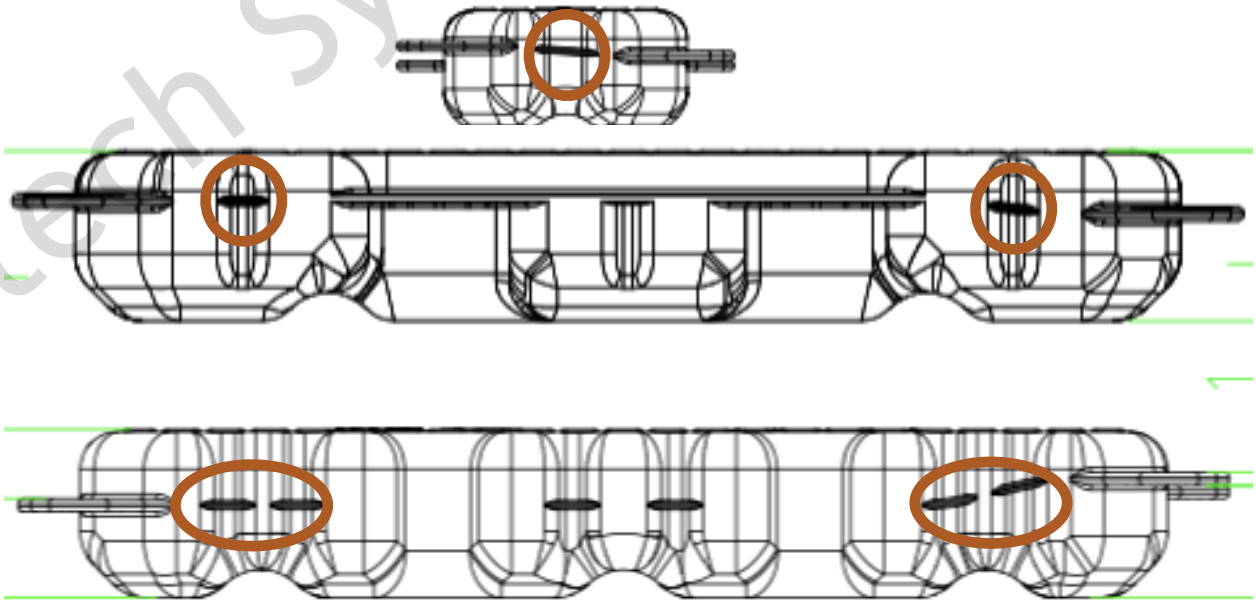


Figure 9

B. The assembly is to be started from the right most corner of the entire plant (with panels facing towards you - assume you are standing on south side facing north side with panels facing south (towards you)).

C. Test assemble 2 to 3 rows of floats first before tightening any fasteners to check alignment and use the sleeve in the holes of the ears to align the holes for inserting M12 nut

D. Connect the SWF such that the bottom right ear and the top right ear of the SWF always come on the bottom of the interconnecting ears. The bottom left ear of the SWF will be in the middle and top left ear of the SWF will be on the top

E. Connect the EF/CF in front of the SWF such that the top ears of EF/CF always come at the top of the interconnection of ears and the bottom ears always come at the middle of the interconnection of ears

F. Keep in mind that when 2 EF/CF are connected together the top ears of the second EF/CF will come on top of the bottom ears of the first EF/CF

G. Connect the BWF such that the right ears are always on the bottom of the interconnection of ears and the bottom left ear is in the middle and top left ear is in the top of the interconnection of ears

H. The above procedure can be repeated to connect all the floats together

Connection Points Table

Small Walkway	**Interconnection Ear Position**		**Interconnection Ear Position**
Top Right Ear	Bottom	**Top Left Ear**	Top
Bottom Right Ear	Bottom	**Bottom Left Ear**	Middle
Big Walkway	**Interconnection Ear Position**		**Interconnection Ear Position**
Top Right Ear	Bottom	**Top Left Ear**	Top
Bottom Right Ear	Bottom	**Bottom Left Ear**	Middle
Panel Float/ Equipment Float	**Interconnection Ear Position**		**Interconnection Ear Position**
Top Right Ear	Top	**Top Left Ear**	Top
Bottom Right Ear	Middle	**Bottom Left Ear**	Middle

I. Take care to align all holes with sleeve before connecting M12 fasters

Figure 10

J. Connect 3 rows on the shore and then push the assembly such that the floats touch the water surface
K. Connect the adjacent rows on the shore and push the assembly into the water
L. Tow the portion of assembly complete to the project location

M. Repeat the steps given above for the next portion of the assembly and then tow this assembly to the project location and interconnect at the location
N. The ears for the interconnecting points will align as provided above during the interconnection of the 2 floating portions
O. These steps may then be repeated to complete the entire assembly

3. Junction Box Installation Procedure:

A. Place the Equipment Float on the table
B. Mount the additional structure on the equipment float using the 4 M12 holes
C. Now mount your junction box on the structure and connect the equipment float on the array as described above

Figure 11

4. Electrical Connections Procedure:

A. While forming each row of the array of floaters, one must interconnect the module to module looping of DC Cables and use UV resistant cable ties on the hole provided on the supporting float or on the modules based on the available cabling length
B. Ensure to complete the module to module earthing looping during the connection of each row on the ground

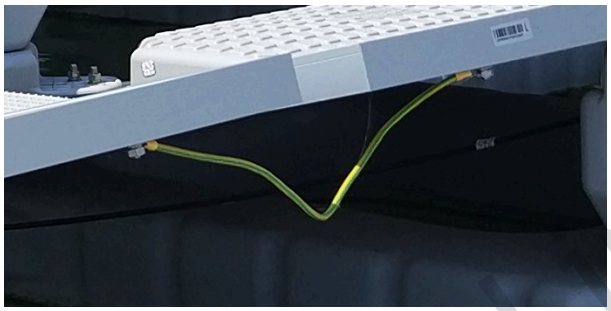


Figure 12

C. Take care to ensure that the loose ends of the cables do not touch with water when floated out and also to ensure the cables are properly tied using UV resistant cable ties to ensure no cables touch the water surface

Figure 13

D. The cables can then be taken on either cable tray or flexible conduits to the shore through equipment floats

Figure 14

5. Installation Checklist:

- Check the connection of the injection nut with support piece on the connecting float
- Check if the solar panel is aligned to the centre of each connecting float so as to have equal overhang on both sides
- Check if aluminium clamps are tightened properly using the M8 hardware to the panel
- Check if aluminium clamps are tightened properly using the M8 hardware with the float
- Check that all interconnection ears are connected as per this manual
- Check the correct tightening of the M12 hardware at each interconnecting point
- Check the if the anchoring / mooring spreader bars are connected as per design to the peripheral floats using interconnection ears
- Check to ensure that the module to module looping of the DC cable and Earthing is done properly before pushing the floats into the water
- Check to ensure the cables are sufficiently spaced above the water by use of cable ties to ensure no damages to the cable
- Check the floats for any damages during assembly before pushing the arrangement into the water

6. Safety Recommendations:

A. It is recommended to always use life jackets while boarding and walking on the floating platform
B. While connecting the floats please ensure to always connect the floats properly before floating into the water
C. During regular maintenance ensure that the connections of the floats are checked for any disparity
D. All cables being used in the solar system must have sufficient slack to prevent damage due to motions and variations in level of water
E. Follow the relevant standards for lighting protection and system earthing
F. All cables used must be water proof as complete contact with water may not be avoided. Having this in mind, please ensure cable management systems are used to provide sufficient distance from water by use of cable ties
G. Cable conduits used to take cables from the floating island to the shore shall be water proof to avoid unnecessary risk during evacuation
H. The floating structure shall not be approached by untrained manpower and shall not be approached without personal safety equipment such as jackets and helmets

PURCHASE SPECIFICATION FOR

SUPPLY OF

ESE LIGHTNING ARRESTOR SYSTEM

PROJECT - 100 MW (AC) FLOATING SOLAR PV PROJECT, NTPC RAMAGUNDAM, TELANGANA

00	09-12-2019	VIPINDAS CP	SREENATH M
Revision	**Date**	**Prepared**	**Checked & Approved**

1.0 Introduction

This technical specification provides BHEL requirements for supply of ESE Lightning protection system for the Floating type solar photovoltaic project.

2.0 Scope of supply

Sl. No	Item Description	Qty
A	**Supply of Lightning arrestor protection system** (comprising of following components) • Supply of ESE lightning arrestor terminal as per clause A 1.0 • Supply of 5m LA mounting pole & accessories for array as per clause A 2.0 • Supply of Lightning Event Counter as per clause A 3.0	82 sets

3.0 Documents to be submitted along with offer

- BHEL specification duly signed and sealed by vendor on each page
- Product catalogue of ESE-LA
- Type test certificates for ESE-LA terminal with test reports complying to NF C 17 102(2011)
- General arrangement and detailed drawings with bill of materials of the overall LA arrangement
- Lightning arrestor protection coverage area calculations
- Installation manual for ESE-LA

A) Supply and Installation of Lightning arrestor protection system

The vendor shall supply lightning protection system to protect the **floating** solar array, floating inverter platform and control room using ESE-type Lightning arrestors complying to NF C 17 102 (2011) standard. Vendor shall provide the lightning radius coverage with supporting calculations.

The complete lightning protection system will comprise the following key components:

1. ESE type Lightning Air Terminal
2. Mounting support and mounting accessories
3. Lightning Event Counter

1.0 ESE type Lightning Air Terminal

1. The lightning air terminal shall be an Early Streamer Emission type terminal which will respond dynamically upon downward leader activity in the near area.
2. The external shape of the advanced lightning rod shall be such that it will limit the development of sharp point corona discharge under static thunderstorm conditions and enhance leader initiation.
3. The lightning air terminal shall have no moving parts and will have no dependence on an external power supply or batteries.
4. All components of the advanced lightning terminal shall be non-corroding.
5. The lightning air terminal should have been tested and certified in accordance with NF C 17-102:2011.
6. The radius of coverage of LA shall be as per protection Level 4 (minimum 107m protection radius).
7. Triggering gap shall be selected so that streamers are not launched until the electric field conditions are at an optimum magnitude for conversion to a stable, propagating upward leader.

2.0 LA mounting pole for Lightning Air Terminal

1. The mounting pole shall be used to support the lightning air terminal. It shall be steel material.
2. Lightning protection system shall protect the solar array modules which are floating on the water body. The lightning pole height shall be minimum 5 m from floater surface level for PV array and inverter platform, and minimum 5 m for control room.
3. The mounting pole shall be supported with minimum 3 set of Guy wires with suitable guy ring, clamps and hardware. The guy wire kit shall be supplied by vendor.
4. Mounting pole shall have appropriate base plate for mounting on floating platform/RCC control room.
5. Suitable provision for running the down conductors (in BHEL scope) through the centre of the pole shall be provided.

3.0 Lightning Event Counter

1. Each ESE type lightning arrester shall be provided with individual lightning event counter to record lightning events arrested by particular ESE LA.
2. Lightning counters shall have IP65 or better rating enclosure and shall have provision for fixing of lightning mast pole using clamp, bolts and nuts.
3. Lightning counter shall have suitable lightning current withstand capacity according to the ESE LA rating. Test links shall be supplied along with each Lightning event counter to enable testing of LA and counter.

B) Documents to be submitted within 7 days after receipt of purchase order

1. General arrangement and detailed drawings with bill of materials of the overall lightning arrestor arrangement
2. Lightning arrestor protection coverage area calculations
3. Mounting details of base plate arrangement.
4. Installation manual for LA-ESE and earthing

C) Documents to be submitted along with consignment

1. ESE LA installation manual with GA drawings
2. Manufacturer test report for each LA

SAFETY PLAN

PROJECT- 100 MW Floating Solar Project ,NTPC, Ramagundam

Doc ref. No. :BHE:NTPC RDM:HSE:01 dated 03.12.2019

Prepared by

PV Sys Engg and HSE Dept, BHEL EDN Bangalore

HEALTH SAFETY ENVIRONMENT POLICY

In BHEL, Health, Safety and Environment (HSE) responsibilities are driven by our commitment to protect our employees and people we work with, community and environment. BHEL believes in zero tolerance for unsafe work/non-conformance to safety and in minimizing environmental footprint associated with all its business activities. We commit to continually improve our HSE performance by:

- Developing safety and sustainability culture through active leadership and by ensuring availability of required resources.
- Ensuring compliance with applicable legislation, regulations and BHEL systems.
- Taking up activities for conservation of resources and adopting sound waste management by following Reduce/Recycle/Reuse approach.
- Continually identifying, assessing and managing environmental impacts and Occupational Health & Safety risks of all activities, products and services adopting approach based on elimination/ substitution/reduction/control.
- Incorporating appropriate Occupational Health, Safety and Environment criteria into business decisions, design of products & systems and for selection of plants, technologies and services.
- Imparting appropriate structured training to all persons at workplace and promoting awareness amongst customers, contractors and suppliers on HSE issues.
- Reviewing periodically this policy and HSE Management Systems to ensure its relevance, appropriateness and effectiveness.
- Communicating this policy within BHEL and making it available to interested parties.

Atul Sobti
Chairman & Managing Director

June 5, 2018

Creating BHEL of tomorrow

BHARAT HEAVY ELECTRICALS LIMITED

CONTENTS

13	EMERGENCY PREPAREDNESS
14	FIRE SAFETY PROCEDURE
15	CONTROL OF DOCUMENTS
16	SAFETY INSPECTION
17	MONTHLY SAFETY REVIEW MEETING
18	TYPICAL DETAILS OF FLOATING SOLAR POWER PLANT
19	ANNEXURES 1. Formats to be used at site 2. JSA (HIRAs) for PV floating system work, Tree felling and clearance work

1.0 INTRODUCTION

The purpose of this Safety Plan is to provide for the systematic identification, evaluation, prevention and control of general workplace hazards, specific job hazards, potential hazards and environmental impacts that may arise from foreseeable conditions during execution of the 100 MW Floating Solar Project.

This document shall be followed by Client's Sub-Contractors at all installation and servicing sites. In case customer specific documents are to be referred, the same will be followed in conjunction with this document.

2.0 APPLICATION

The document is applicable for execution of the 100 MW Floating Solar Project and it is expected that Client and Sub-contractor are committed to the following guidelines:

- Ensure that the Health and Safety of all persons at work site is not adversely affected by the work.
- Ensure protection of environment at the worksite.
- Ensure compliance at all times with the relevant statutory and contractual Safety requirements.
- Provide trained, experienced and competent personnel. Ensure medically fit personnel only are engaged at work.
- Provide and maintain plant, places and systems of work that are safe and without risk to health and the environment.
- Provide all personnel with adequate information, instruction, training and supervision.
- Effectively control, co-ordinate and monitor the activities of all personnel on the Project sites including contractors in respects of Safety.
- Establish effective communication on SAFETY matters with all relevant parties involved in the Project works.
- Ensure that all work planning takes into account all persons that may be affected by the work.
- Ensure fitness testing of all T&Ps. Lifting appliances like cranes, chain pulley blocks etc. are to be certified by competent authority.
- Ensure timely provision of resources to facilitate effective implementation of SAFETY requirements.
- Ensure continual improvements in SAFETY performance
- Ensure conservation of resources and reduction of wastage.
- Capture the data of all incidents including near misses, process deviation etc. Investigate and analyze the same to find out the root cause.
- Ensure timely implementation of correction, corrective action and preventive action.

3.0 TERMINOLOGIES

INCIDENT

Work- related event(s) in which an injury or ill health (regardless of severity) or fatality occurred, or could have occurred.

NEAR MISS

An incident where no ill health, injury, damage or other loss occurs, but it had a potential to cause, is referred to as “Near-Miss incident”.

MAN-HOUR WORKED

The total number of employee hours worked by all employees including subcontractors working in the premises. It includes managerial, supervisory, professional, technical, clerical and other workers including contract labors. Man-hours worked shall be calculated from the payroll or time clock recorded including overtime. When this is not feasible, the same shall be estimated by multiplying the total man-days worked for the period covered by the number of hours worked per day. The total number of workday for a period is the sum of the number of men at work on each day of period. If the daily hours vary from department to department separate estimate shall be made for each department and the result added together.

FIRST AID CASES

First aids are not essentially all reportable cases, where the injured person is given medical treatment and discharged immediately for reporting on duty, without counting any lost time. Please refer Format 03 for requirement of items with respect to treatment for First Aid Cases.

LOST TIME INJURY

Any work injury which renders the injured person unable to perform his regular job or an alternative restricted work assignment on the next scheduled work day after the day on which the injury occurred.

MEDICAL CASES

Medical cases come under non-reportable cases, where owing to illness or other reason the employee was absent from work and seeks Medical treatment.

TYPE OF INCIDENT / ACCIDENT & THEIR REPORTING:

The three categories of Incident / accident are as follows:

Non-Reportable Cases:

An accident, where the injured person is given medical help and discharged for work without counting any lost time.

Reportable Cases:

In this case the injured person is disabled for 48 hours or more and is not able to perform his duty.

Injury Cases:
These are covered under the heading of non-reportable cases. In these cases the accident caused injury to the person, but he still continues in his duty.

TOTAL REPORTABLE FREQUENCY RATE

Frequency rate is the number of Reportable Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula read as:

$$\frac{\text{Number of Reportable LTI}}{\text{Total Man Hours Worked}} \times 1{,}000{,}000$$

SEVERITY RATE

Severity rate is the Number of days lost due to Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula reads as:

$$\frac{\text{Days lost due to LTI}}{\text{Total Man Hours Worked}} \times 1{,}000{,}000$$

INCIDENCE RATE

Incidence Rate is the Number of LTI per one thousand manpower deployed.

$$\frac{\text{Number of LTI} \times 1000}{\text{Average number of manpower deployed}}$$

MANAGEMENT REPRESENTATIVE: Representative from Project Head

OCP: Operation Control Procedures

PPE: Personal Protective Equipment

4.0 ROLES & RESPONSIBILITIES

4.1 SAFETY OFFICER

- Carry out safety inspection of Work Area, Work Method, Men, Machine & Material, and other tools and tackles. Record observations as per Format 01 on a weekly basis.
- Facilitate inclusion of safety elements into Work Method Statement.
- Highlight the requirements of safety through Tool-box / other meetings.
- Conduct investigation of all accident/dangerous occurrences & recommend appropriate safety measures.
- Advice & co-ordinate for implementation of SAFETY permit systems & OCPs. Convene SAFETY meeting & minute the proceedings for circulation & follow-up action.
- Plan procurement of PPE & Safety devices and inspect their healthiness.
- Facilitate administration of First-Aid
- Facilitate screening of workmen and safety induction.
- Conduct fire drill and facilitate emergency preparedness
- Design campaigns, competitions & other special emphasis programs to promote safety in the workplace.
- Notify site personnel for non-conformance to safety noms observed during site visits / site inspections.
- Recommend to Site In charge for immediate discontinuance of work until rectification, of such situations warranting immediate action in view of imminent danger to life or property or environment.
- To decline acceptance of such PPE / safety equipment that do not conform to specified requirements.
- Encourage raising Near Miss Report on safety along with, improvement initiatives on safety.

4.2 ALL EMPLOYEES

- To adopt safe working practices
- To take corrective action and preventive action in case any non-conformity is observed on product / process / system with respect to Occupational Health, Safety and Environment.
- To report all incidents including near miss to SAFETY officer or

SAFETY coordinator.

- In case any particular activity / work has extremely high consequential risk or high environmental impact, the employee shall bring it to the notice of Site In charge before starting the work.
- To ensure that the workers are engaged by the contractor for the job after undergoing induction training.
- To ensure that the persons engaged in his area, follow the safety rules like using appropriate PPEs.
- To get involved in exercises like Job Safety Analysis and Work Permit System.
- To engage licensed electricians for site electrical works.
- To report any incident including near misses or safety lapses immediately to safety officer/SAFETY coordinator
- To support/co-operate with audit team members as & when safety audits are carried out.
- To involve in investigation, if any incident occurs in his work area.
- To participate in safety promotional programmers'.
- To attend the safety committee meeting, if he is a member/invitee
- To ensure that only suitable Tackles & Plants and qualified persons are engaged.

5.0 SUB-CONTRACTOR REPRESENTATIVE AT SITE

- Shall fill-up agreement form for compliance to relevant SAFETY Plan for Site Operations.
- Shall ensure fulfillment of relevant safety requirements of 100 MW floating solar Project and practice very strictly in his area of work in consultation with his concerned engineer and the safety officer.
- Shall screen all workmen for health and competence requirement before engaging for the job and periodically thereafter as required.
- Shall not engage any employee below 18 years.
- Shall arrange for all necessary PPEs like safety helmets, belts, safety, shoes, face shield, high visibility vest, hand gloves etc. before starting the job. Shall ensure that no working men/women carry excessive weight more than stipulated in BOCW Rules and Regulations.
- Shall ensure that all Tackles & Plants engaged are tested for fitness

and have valid certificates from competent authorities.

- Shall adhere to the instructions laid down in Operation Control Procedures (OCPs Point No 8)
- Shall ensure that person working above 3.3 meter should use Safety Harness tied to a life line/stable structure.
- Shall ensure that materials are not thrown from height. Caution to be exercised to prevent fall of material from height.
- Shall report all incidents (Fatal/Major/Minor/Near Miss) to the Site engineer /SAFETY officer of the 100 MW floating solar Project.
- Shall ensure that adequate illumination is arranged during night work.
- Shall ensure that all personnel working under subcontractor are working safely and do not create any Hazard to self and to others.
- Shall ensure display of adequate signage/posters on HSE.
- Shall ensure that mobile phone is not used by workers while working.
- Shall ensure conductance of mock drill, induction training and training on the site.
- Shall ensure good housekeeping.
- Shall ensure adequate valid fire extinguishers are provided at the worksite.
- Shall adequate drinking water at work site.
- Shall ensure adequate emergency preparedness.

5.1 DEPLOYMENT OF TOOLS & PLANTS

- As a measure to ensure that machinery, equipment and tools being mobilized to the construction site are fit for purpose and are maintained in safe operating condition and complies with legislative and owner requirement, inspection shall be arranged by in-house competent authority for acceptance as applicable.
- The machinery and equipment to be employed for this purpose shall include but not limited to the following:
  - Mobile cranes.
  - Side Booms.
  - Forklifts.
  - Grinding machine.
  - Drilling machine.
  - Air compressors.
  - Welding machine.
  - Generator sets.
  - Dump Trucks, tractors.
  - JCBs, Excavators.

- Hand tools.
- Road Rollers
- Vibration Compacters
- Boring Machine
- Chipping Machines
- Hammer Machines
- Breakers

5.2 DEPLOYMENT OF MANPOWER

- As a measure to ensure that manpower being mobilized to the construction site is fit and competent for safe working, screening arrangement shall be made by the sub-contractors to fulfill contractual as well as legislative requirement.
- Examination of medical fitness shall be conducted through qualified medical professional for all workers to be deployed.

5.3 DEPLOYMENT OF PPEs

The following matrix recommends usage of minimum PPEs against the respective job. The PPEs shall conform to the relevant standards as listed in the reference under clause 3.0 and bear ISI mark. All the PPEs shall be periodically checked for its quality before issue. The users shall be advised to check the PPEs themselves for any defect before putting on. The defective ones shall be repaired/ replaced. The issuing agency shall maintain register for issue and receipt of PPEs. The Helmets shall have logo or name (abbreviation of agency name permitted) affixed or printed on the front. The body harnesses shall be serial numbered.

Sl. No	Type of work	PPEs (Subject to applicability of process only)
1	Concrete and asphalt mixing	Nose mask, hand glove, apron and gum boot
2	Welders/Grinders/ Gas cutters	Welding/face screen, apron, hand gloves. Helmet fitted with welding shield is preferred for welders
3	Stone/ concrete breakers	Safety goggles, hand gloves
4	Electrical Work	Rubber hand glove, Electrical Resistance shoes
5	Insulation Work	Hand gloves
6	Work at height	Double lanyard full body harness, Fall arrestor (specific cases)
7	Grit/Sand blasting	Blast suit, blast helmet, gloves
8	Painting	Plastic gloves, Respirator (for spray Painting)

Besides the PPEs mentioned above, the persons shall use helmet and safety shoe. The visitors shall be issued Helmet and any other PPEs as deemed appropriate for use in the area of work.

Color Code for Helmets:

1. Workmen: Yellow.
2. Safety staff: Green.
3. Engg, supervisor, visitor, site in charge : White.

MEDICAL FACILITIES

FIRST AID PROVIDER

- Every injury shall be treated, recorded and reported.
- Refresher course on first aid shall be conducted as necessary.
- List of qualified first aiders and their contact numbers should be displayed at major locations.

FIRST AID BOX

- First aid facilities shall be provided and maintained.
- The first aid box shall be kept by first aider who shall always be readily available during the working hours of the work place. His name and contact number to be displayed on the box.
- The first aid box shall be distinctly marked with a Red Cross on white background.
- Details of contents of first aid box is given in **Format No.02**
- Monthly inspection of First Aid Box shall be carried out by the Site In charge as per **format no 02.**

HEALTH CHECKUP

The persons engaged at the site shall undergo health checkup as per the **format no 03** before induction.

a. Height workers
b. Drivers/crane operators/riggers
c. Confined space workers
d. Shot/sandblaster
e. Welding and NDE personnel.

PROVISION OF EMERGENCY VEHICLE

- In case of any emergency a vehicle shall be made available at

workplace on short notice to handle any emergency. This shall be by way of tying up with customer's medical centre /local hospitals/ sub-contractors by mutual aid agreement.

6.0 SAFETY TRAINING & AWARENESS

SAFETY INDUCTION TRAINING

All persons entering into project site shall be given SAFETY induction training by the SAFETY officer of 100 MW floating solar Project.

In-house induction training subjects shall include but not limited to:

- Briefing of the Project .
- Safety objectives and targets.
- Site SAFETY rules.
- Site SAFETY hazards
- First aid facility.
- Emergency Contact No.
- Accident reporting.
- Fire prevention and emergency response.
- Proper safety wear & gear must be issued to all the workers being registered for the induction.
- They must arrive fully dressed in safety wear & gear to attend the induction.
- Any one failing to conform to this safety wear& gear requirement shall not qualify to attend.
- Each employee shall undergo safety induction tranning

TOOL BOX TALK

- Tool Box talk shall be conducted by safety officer to work groups prior to the start of work. The agenda shall consist of the following:
  - Details of the job being intended for immediate execution.
  - The relevant hazards and risks involved in executing the job and their control and mitigating measures.
  - Specific site condition to be considered while executing the job like high temperature, humidity, unfavorable weather etc.
  - Recent non-compliances observed.
  - Appreciation of good work done by any person.
- Record of Tool box talk shall be maintained as per format no 06

TRAINING ON HEIGHT WORK

Training on height work shall be imparted to all workers working at height by in- house/external faculty. The training shall include following topics:

- Use of PPEs
- Use of fall arrester, life line.
- Safe climbing through monkey ladders.
- Inspection of PPEs.
- Medical fitness requirements.
- Mock drill on rescue at height.
  Dos & Don'ts during height work.

SAFETY PROMOTION-SIGNAGE, POSTERS,

Display of SAFETY posters and banners.

- Site shall arrange appropriate posters, banners, slogans in local/Hindi/,English languages at workplace

Display of SAFETY signage

- Appropriate SAFETY signage shall be displayed at the work area to aware workmen and passersby about the work going on and do's and don'ts to be followed.

SAFETY awareness program/SAFETY training program

- Site will arrange SAFETY awareness program periodically on different topics including medical awareness for all personnel working at site.

- SAFETY officer shall arrange training program based on site condition

7.0 SAFETY COMMUNICATION

MONTHLY SAFETY REPORTING

- SAFETY information of Site shall be reported monthly through Monthly Site SAFETY report (MSR) as per format 04
- The period of reporting shall be 1st of each calendar month.

8.0 OPERATIONAL CONTROL

8.1 EXCAVATION WORK SAFETY:

- Avoid damage / personal injury during excavation work at sites.
- Ensure proper barricading by ribbon or Hard barricading of the excavated area.
- Proper side slopes of the excavation as per the type of soil should be maintained.
- Where side slopes cannot be provided due to space constraints before excavation, sheet piling must be done to prevent the collapse of earth.
- As soon as the job is completed, immediate back filling to be done.
- No personnel be allowed within the swing area of mechanical excavator when work is in progress.
- Proper lighting to be arranged when the excavation is carried out at night.
- Excavated earth to be dumped/ stored in a designated place only.
- Surplus earth to be transported and disposed in the authorized area.
- Site safety department to identify all possible hazard areas related to excavation work and ensure control.
- Use proper PPE"s.
- Ensure adequate caution signs are displayed in the area of operation.

9..WORK PERMIT SYSTEM

- The following activities shall come under Work Permit System
  a. Height working of 3.3 metre and above
  b. Excavation more than 4 meter depth
  c. Heavy lifting by machinery
- "SAFETY Procedure for Work Permit System" shall be followed while implementing permit system.
- Permit applicant shall apply for work permit of particular work activity at particular location before starting of the work with Job Hazard Analysis.
- Permit signatory shall check that all the control measures necessary for the activity are in place and issue the permit to the permit holder.
- Permit holder shall implement and maintain all control measures during the period of permit
  He will close the permit after completion of the work. The closed

permit shall be archived with SAFETY personnel of site.

10. HOUSEKEEPING

- Proper housekeeping to be maintained at work place and the following are to be taken care of on daily basis.
- All surplus earth and debris are removed/disposed off from the working areas to identified locations.
- Unused/Surplus cables, steel items and steel scrap lying scattered at different places/elevation within the working areas are removed to identified locations.
- All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from workplace to identified locations. Sufficient waste bins shall be provided at different work places for easy collection of scrap/waste. Scrap chute shall be installed to remove scrap from higher location.
- Access and egress (stair case, gangways, ladders etc.) path should be free from all scrap and other hindrances.
- Workmen shall be educated through tool box talk about the importance of housekeeping and encourage not to litter.
- Fabricated steel structures, pipes & piping materials shall be stacked properly.
- No parking of trucks/trolleys, cranes and trailers etc. shall be allowed in the camp, which may obstruct the traffic movement as well as below LT/HT power lines.
- Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas.

11.WASTE MANAGEMENT

STORAGE AND COLLECTION

- Different types of rubbish/waste should be collected and stored separately.
- Paper, oily rags, smoking material, flammable, metal pieces should be collected in separate bins with close fitting lids.
- Rubbish should not be left or allowed to accumulate on construction and other workplaces.
- Construction rubbish should not be burnt near working site.

SEGGREGATION

- Earmark the scrap area for different types of waste.
- Store wastes away from building.

- Oil spill absorbed by non-combustible absorbent should be kept in separate bin.
- Clinical and first aid waste stored and incinerated separately.

DISPOSAL

- Sufficient containers and scrap disposal area should be allocated.
- All scrap bin and containers should be conveniently located.
- Provide self-closing containers for flammable/spontaneously combustible material.
- Keep drainage channels free from choking.
- Maintain a schedule for collection and disposal of waste.

12. WARNING AND SIGNS

- Appropriate sign to be displayed at scrap storage area
- No toxic, corrosive or flammable substance to be discarded into public sewage system.
- Waste disposal shall be in accordance with best practice.

13.0 :EMERGENCY PREPAREDNESS AND RESPONSE

- Emergency preparedness and response capability of site shall be developed as per project requirement.
- Availability of adequate number of first aid providers and fire fighters shall be ensured by sub-contractors
- Assembly point shall be earmarked and access to the same from different location shall be shown
- Fire exit shall be identified and pathway shall be clear for emergency escape in Stores area and office area.
- Appropriate type and number of fire extinguishers shall be deployed as per fire extinguisher deployment plan of BHEL and validity shall be ensured periodically through inspection
- First aid boxes shall be strategically placed at work places to cater to emergency needs.

14.0: FIRE SAFETY PROCEDURE

1. Site-in-charge / Safety Officer will make periodical review of the site Fire Protection, Prevention Preparedness, Site conditions and available fire protection equipment.
2. A mutual aid agreement with local Fire station for availability of Fire tender shall be made.
3. It is very imperative good contact with Local fire station for availability of

Fire tender in case of emergencies, in additional to their own fire equipment.

4. Fire Protection, Prevention and Preparedness Inspections - The Contractor /Sub-Contractor will be required to make frequent fire prevention inspections of his work site and operating facilities. Deficiencies will be corrected at once.
5. Emergency telephone number to be displayed at all important places.

15. CONTROL OF DOCUMENTS

All documents shall be controlled as per SAFETY Procedure for Document Control.

16.0 SAFETY INSPECTION

Inspection on SAFETY for different activities being carried out at site shall be done to ensure compliance to safety requirements.

DAILY SAFETY CHECKS

Both the Site Supervisors and SAFETY Supervisors are to conduct daily site safety inspection around work activities and premises to ensure that work methods and the sites are maintained to the acceptable standard.

INSPECTION OF PPE

- PPEs shall be inspected by SAFETY officer at random once in a week as per **Format no 07 for** its compliance to standard and compliance to use and any adverse observation shall be recorded in the PPE register.
- The applicable PPEs for carrying out particular activities are listed below.
- The IS standard to be complied to, for different PPEs, is given as follows:

RELEVANT IS-CODES FOR PERSONAL PROTECTION

IS: 2925 – 1984	Industrial Safety Helmets.
IS: 4770 – 1968	Rubber gloves for electrical purposes.
IS: 5557 – 1969	Industrial and Safety rubber knee boots.
IS: 5983 – 1978	Eye protectors.
IS: 9167 – 1979	Ear protectors.
IS: 3521 – 1983	Industrial Safety Belts and Harness

INSPECTION OF Tools & Plants

- A master list of Tools & Plants shall be maintained by each subcontractor.
- All Tools & Plants being used at site shall be inspected by SAFETY officer once in a month as per **Format no 08** for its healthiness and maintenance.
- The Tools & Plants which require third party inspection shall be checked for its validity during inspection.
- The certificate of Tools & Plants shall be monitored as per Format no **09**

INSPECTION OF CRANES AND WINCHES

- Cranes and winches shall be inspected by the operator through a daily checklist for its safe condition (as provided by the equipment manufacturer) before first use of the day.
- Cranes and Winches shall be inspected by SAFETY officer once in a month as per **format no 10** for healthiness, maintenance and validity of third party inspection and SWL shall be displayed.
- The date of third party inspection and next due date shall be painted on cranes and winches.

INSPECTION ON HEIGHT WORKING (ONLY FOR CMCS AS APPLICABLE)

- Inspection on height working shall be conducted by SAFETY Coordinator of Construction agency before start of work to ensure safe working condition including provision of
    - Safety Harness
    - Fencing and barricading
    - Warning signage
    - Covering of opening
    - Proper scaffolding with access and egress.
    - Illumination

- Inspection on height working shall be conducted once in a week by SAFETY officer as per format no 11
- Height working shall not be allowed during adverse weather.

INSPECTION ON ELECTRICAL INSTALLATION /APPLIANCES

- Ensure proper earthing in electrical installation
- Use ELCB at electrical booth.
- Electrical installation shall be properly covered at top where required
- Use appropriate PPEs while working
- Use portable electrical light < 24 V in confined space and potentially wet area.
- Monthly inspection shall be carried out as per format no 12

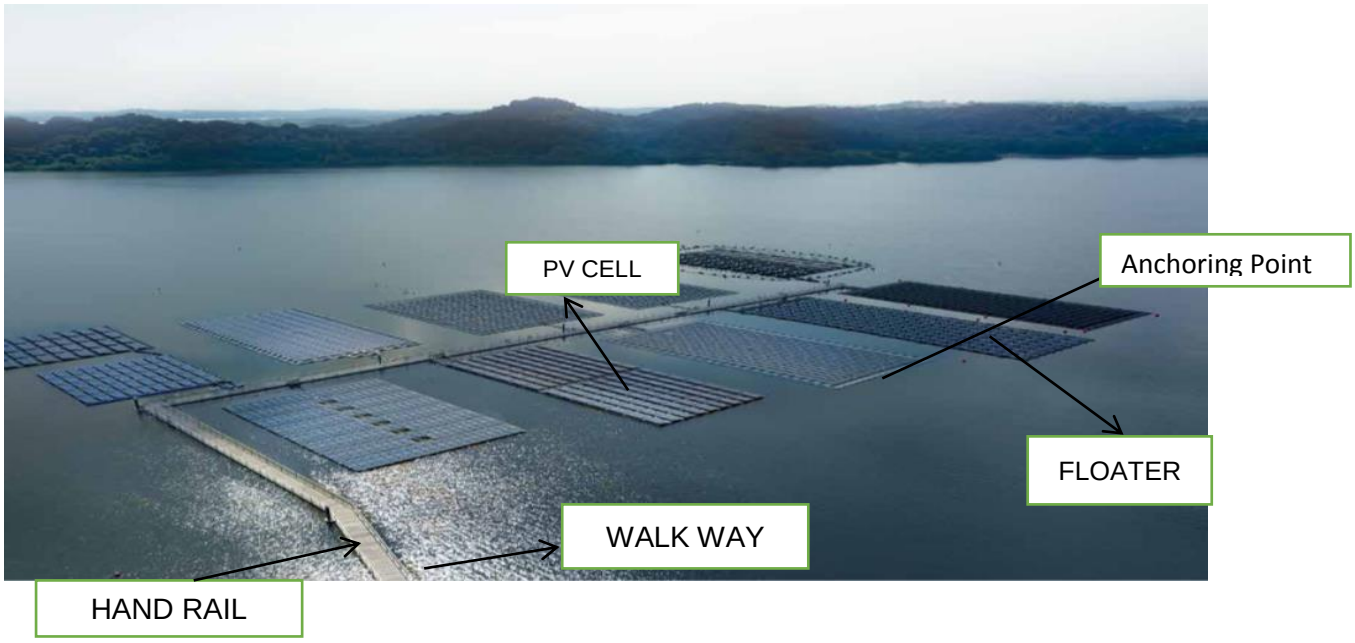
17. MONTHLY SAFETY REVIEW MEETING

- Site shall hold SAFETY review meeting every month to discuss and resolve SAFETY issues of site and improve SAFETY performance. It will also discuss the incidents occurred since previous meeting its root cause and corrective action and preventive action.
- The meeting shall be chaired by Site In charge, convened by SAFETY coordinator and attended by all HOS, Site In charge of Subcontractors and SAFETY representative of Subcontractors.
- MOM on the discussion will be circulated to the concerned for implementation.

18.0 TYPICAL DEPICTION OF FLOATING SOLAR PV SYSTEM (FOR GENERAL REFERENCE)

FLOATING SOLAR POWER ERECTION SAFETY

(Floating platform Under construction)



(Typical View of completed Solar PV Floating platform)

SYSTEM COMPONENTS:

1. Solar PV modules for conversion of solar radiation to electrical energy/
2. Anchoring systems: Anchoring system refers to permanent under-water structure to secure floating platforms.
3. Pontoon: A pontoon is floatation device with enough buoyancy to float by itself as well as with a heavy load.
4. Floats: Multiple plastic hollow floats with effective buoyancy to self-weight ratio are combined over and over again, forming a giant pontoon. The floats are typically made of HDPE (high density polyethylene), known for its tensile strength, maintenance free property.
5. Mooring system: A mooring system usually refers to any permanent structure on the banks to which floats are secured.
6. Cables and connectors: Electricity is drawn from the solar array and transported to the land. Therefore, the power can be fed to the grid or stored in batteries.

RISKS AND HAZARDS:

1. Identified as per Job Risk Assessment exercise and HIRA Doc 1 and 2 attached.

PRECAUTIONS:

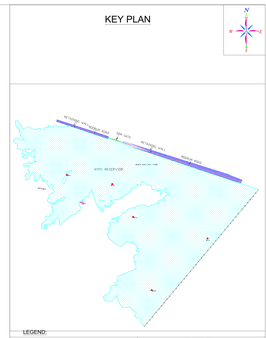
1. As mentioned in HIRA Doc 1 and 2.

19.0 SITE RECORDING FORMATS

****

SCOPE OF VENDORS:
L1: BLOCK 1 TO 24.
L2: BLOCK 25 TO 40.

KEY PLAN



LEGEND:

PARTICULAR	SYMBOL
MOORUM ROAD	
RETAINING WALL	
DAM GATE	
BENCHMARK	
BORE HOLE	
WATER LOGGED AREA	
CONTOUR LINE-MAJOR/MINOR	
GRID LINE	
PROPOSED BHEL BOUNDARY	
ACTUAL WATER BODY	

TOTAL SURVEY AREA : 703.95ACRES
WATER BODY : 564.34ACRES
LAND : 139.61ACRES

VILLAGE : RAMAGUNDAM
DISTRICT : PEDDAPELLI
STATE : TELANGANA

COORDINATES OF BH

NAME	EASTING	NORTHING	RL IN 'M'
BH-1	336746.00	2072625.00	165.125
BH-2	337297.00	2072514.00	160.137
BH-3	337550.00	2072115.00	161.737
BH-4	338454.00	2071854.00	157.758
BH-5	337775.00	2071226.00	161.396

COORDINATES OF BM

NAME	EASTING	NORTHING	RL IN 'M'
BM-1	336436.10	2072463.62	168.93
BM-2	336449.59	2072454.65	168.11
BM-3	336915.17	2072289.90	166.92
BM-4	336932.91	2072275.94	167.42

(1) All dimensions and levels are in meters Unless Otherwise Mention.
(2) The Spot Level as marked on the drawing is 5mt.
(3) Grid Interval is – 20mt x 20mt.
(4) Boundary markings including levels are jointly verified at site.

Rev.	DATE	DRN.BY	CHKD.BY	APPRD. BY	DESCRIPTION
01	02.10.19	PRAHALLAD	TEJA	SNS	DRAFT SUBMISSION

CLIENT: BHARAT HEAVY ELECTRICALS LIMITED

SURVEYED BY:
SWAYIN & ASSOCIATES
77, SATYANAGAR,
PH – (91-0674)2570015/2572971/2570458

TITLE: BATHYMETRIC SURVEY DWG OF WATER BODY FLOATING SOLAR POWER PLANT OF 100MW AT NTPC RAMAGUNDAM

PROJECT: CONDUCTING GEOTECHNICAL INVESTIGATION AND BATHYMETRIC SURVEY WORKS OF THE WATER BODY FOR PROPOSED PROJECT SITE OF FLOATING SOLAR POWER PLANT OF 100MW AT NTPC RAMAGUNDAM

SCALE	DATE	DRAWING NO.	REV.
1:1000	02.10.19	B/SA/BHEL/BATHYMETRIC SURVEY DWG	01

GENERAL CONDITIONS

OF

CONTRACT

2019

ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್, ವಿದ್ಯುನ್ಮಾನ ವಿಭಾಗ, ಬೆಂಗಳೂರು

भारत हेवी इलेक्ट्रिकल्स लिमिटेड, इलेक्ट्रानिक्स डिवीज़न, बेंगलुरु

Bharat Heavy Electricals Limited, Electronics Division, Bengaluru

CONTENTS

Chapter-1

2. Chapter-2

CHAPTER -1

1. GENERAL INSTRUCTION TO TENDERERS

1.1. DESPATCH INSTRUCTION

i) The General Conditions of Contract form part of the Tender specifications. All pages of the tender documents shall be duly signed, stamped and submitted along with the offer in token of complete acceptance thereof. The information furnished shall be complete by itself. The tenderer is required to furnish all the details and other documents as required in the following pages

ii) Tenderers are advised to study all the tender documents carefully. Any submission of tender by the tenderer shall be deemed to have been done after careful study and examination of the tender documents and with the full understanding of the implications thereof. Should the tenderers have any doubt about the meaning of any portion of the Tender Specification or find discrepancies or omissions in the drawings or the tender documents issued are incomplete or shall require clarification on any aspects, the scope of work etc., he shall contact the authority inviting the tender well in time (so as not to affect last date of submission) for clarification before the submission of the tender. Tenderer's request for clarifications shall be with reference to Sections and Clause numbers given in the tender documents. The tender specifications and terms and conditions shall be deemed to have been accepted by the tenderer in the offer. Pre requirements and conditions shall be liable for rejection.

iii) Integrity pact (IP): If NIT calls for Integrity Pact, the same shall be duly signed & stamped by the authorised signatory & submitted along with tender document.

1.2. SUBMISSION OF TENDERS

1.2.1 The tenderers must submit their tenders as per instructions in the NIT

1.2.2 BHEL takes no responsibility for delay, loss or non-receipt of tenders sent by post/courier. The tenders received after the specified time of their submission are treated as 'Late Tenders' and shall not be considered under any circumstances. Offers received by Fax/Email/Internet shall be considered as per terms of NIT.

1.2.3 Tenders shall be opened by authorised Officer of BHEL at his office at the time and date as specified in the NIT, in the presence of such of those tenderers or their authorised representatives who may be present

1.2.4 Tenderers whose bids are found techno commercially qualified shall be informed the date and time of opening of the Price Bids and such Tenderers may depute their representatives to witness the opening of the price bids. BHEL's decision in this regard shall be final and binding.

1.2.5 Before submission of Offer, the tenderers are advised to inspect the site of work and the environments and be well acquainted with the actual working and other prevalent conditions, facilities available, position of material and labour, means of transport and access to Site, accommodation, etc. No claim will be entertained later on the grounds of lack of knowledge of any of these conditions.

1.3. ***LANGUAGE***

1.3.1 The tenderer shall quote the rates in English language and international numerals. These rates shall be entered in figures as well as in words. For the purpose of the tenders, the metric system of units shall be used.

1.3.2 All entries in the tender shall either be typed or written legibly in ink. Erasing and over-writing is not permitted and may render such tenders liable for rejection. All cancellations and insertions shall be duly attested by the tenderer.

1.4 ***PRICE DISCREPANCY:***

1.4.1 Conventional (Manual) Price Bid opening:

i) If, in the price structure quoted for the required goods/services/works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of BHEL there is obvious misplacement of decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly

ii) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected;

iii) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject of (i) and (ii) above.

iv) If there is such discrepancy in an offer, the same shall be conveyed to the bidder with target date up to which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of BHEL, the bid is liable to be ignored.

v) In case of lump sum price, if there is any difference between the amount in figures and in words, the amount quoted by the bidder in words shall be taken as correct.

vi) In case of omission in quoting any rate for one or more items, the evaluation shall be done considering the highest quoted rate obtained against the respective items by other tenderers for the subject tender. If the tenderer becomes L-1, the notional rates for the omission items shall be the lowest rates quoted for the respective items by the other tenderers against the respective omission items for the subject job and the 'Total quoted price (loaded for omissions)' shall be arrived at. However the overall price remaining the same as quoted originally, the rates for all the items in the 'Total quoted price (loaded for omissions)' shall be reduced item wise in proportion to the ratio of 'Original' total price and the 'Total quoted price (loaded for omissions)".

1.4.2 Reverse Auction: In case of Reverse Auction, the successful bidder shall undertake to execute the work as per overall price offered by him during the Reverse Auction process. In case of omission of rates, the procedure shall be as per 'Guidelines for Reverse Auction' enclosed.
i) Offers from tenderers who are under suspension (banned) by any Unit/Region/Division of BHEL shall not be considered.
ii) Offers from tenderers who do not comply with the latest guidelines of Ministry/ Commissions of Govt of India shall not be considered.

1.5. ***EVALUATION OF BIDS***

i) Technical Bids submitted by the tenderer will be opened first and evaluated for fulfilling the Pre-Qualification criteria and other conditions in NIT/Tender documents, based on documentary evidences submitted along with the offer, BHEL reserves the right to ask for proofs/documents, clarification in relation to Technical/commercial data during tender evaluation

ii) Price Bids of shortlisted bidders shall only be opened either through the conventional price bid opening or through electronic Reverse Auction, at the discretion of BHEL

iii) Price Bids of unqualified bidders shall not be opened. Reasons for rejection shall be intimated to the vendor before the opening of Price bid.

1.6. ***DATA TO BE ENCLOSED***

The following information in full shall be furnished by the tenderer. Non-submission of this information may lead to rejection of the offer.

i) INCOME TAX PERMANENT ACCOUNT NUMBER, GSTIN, SAC, HSN Certified copies of PAN, GSTIN shall be furnished along with tender. The names, addresses and contact information of the Directors/Partners shall be furnished along with the offer.

ii) An attested copy of the Power of Attorney, in case the tender is signed by an individual other than the sole proprietor.

iii) IN CASE OF INDIVIDUAL TENDERER:

His / her full name, address, PAN, GSTIN and place & nature of business to be furnished.

iv) IN CASE OF PARTNERSHIP FIRM

The names of all the partners and their addresses, a copy of the partnership deed/instrument of partnership shall be enclosed.

v) IN CASE OF COMPANIES:

Date and place of registration including date of commencement certificate in case of Public Companies (certified copies of Memorandum and articles of Association are also to be furnished). Nature of business carried on by the Company and the provisions of the Memorandum relating thereof.

*1.7. **AUTHORISATION AND ATTESTATION***

Tenders shall be signed by a person duly authorised/empowered to do so. An attested copy of the Power of Attorney, in case the tender is signed by an individual other than the sole proprietor shall be submitted along with the tenders

*1.8. **EARNEST MONEY DEPOSIT***

1.8.1 Every tender must be accompanied by the prescribed amount of Earnest Money Deposit (EMD) in the manner described herein.

The EMD may be accepted only in the following forms:
(i) Electronic Fund Transfer credited in BHEL account (before tender opening)
(ii) Banker's cheque/ Pay order/ Demand draft, in favor of BHEL (along with offer)In case total EMD amount is more than Rs 20 Lakh, the amount in excess of Rs 20 lakh maybe accepted in the form of Bank Guarantee from scheduled bank. The Bank Guarantee in such cases shall be valid for at-least six months.
(iii) Through SBI collect (before tender opening)
(iv) No other form of EMD remittance shall be acceptable to BHEL

1.8.2 EMD by the bidder will be forfeited as per Tender Documents if

i) After opening the tender and within the offer validity period, the tenderer revokes his/her tender or makes any modification in his tender which is not acceptable to BHEL.
ii) The Contractor fails to deposit the required Security deposit or commence the work within the period as per LOI/ Contract.
iii) EMD by the tenderer shall be withheld in case any action on the tenderer is envisaged in derailing the tender process by unlawful means

1.8.3 EMD shall not carry any interest.

1.8.4 In the case of unsuccessful bidders, the Earnest Money will be refunded to them within a reasonable time after acceptance of award by successful tenderer.

1.8.5 EMD of successful tenderer will be converted as part of Security Deposit

*1.9. **SECURITY DEPOSIT***

The total amount of Security Deposit will be 5% of the contract value (including all applicable taxes) EMD of the successful tenderer shall be converted and adjusted towards the required amount of Security Deposit.

1.9.1 Modes of Security deposit:

The balance amount to make up the required Security Deposit of 5% of the contract value may be accepted in the following forms:
i) Cash (as permissible under the extant Income Tax Act)
ii) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL
iii) Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL
iv) Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL)
v) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL) (Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)
vi) 50% of the required Security Deposit, including the EMD, should be paid before start of the work. Balance of the Security Deposit can be collected by deducting10% of the gross amount progressively from each of the running bills of the Contractor till the total amount of the required Security Deposit is collected. If the value of work done at any time exceeds the contract value, the amount of Security Deposit shall be correspondingly enhanced and the additional Security Deposit shall be immediately deposited by the Contractor or recovered from payment/s due to the Contractor. Security Deposit shall be released to the Contractor upon fulfilment of contractual obligations as per terms of the contract.

1.9.2 The Security Deposit shall not carry any interest.

1.9.3 The validity of Bank Guarantees towards Security Deposit shall be initially up to the completion period as stipulated in the Letter of Intent/Award (plus maintenance period if applicable), and 03 months claim period. The same shall be kept valid by proper renewal till the acceptance of Final Bills of the Contractor, by BHEL

1.9.4 BHEL reserves the right of forfeiture of Security Deposit in addition to other claims and penalties in the event of the Contractor's failure to fulfill any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract. BHEL reserves the right to set off the Security Deposit against any claims of other contracts with BHEL.

1.10. ***REFUND OF SECURITY DEPOSIT***

50% of the security deposit may be refunded on completion of the work after payment of the final bill and the balance 50% of the security deposit is refunded only after the expiry of the maintenance period from date of completion of work as stipulated in the contract concerned.

1.10.1 *DEFECTS LIABILITY PERIOD:*

The contractor shall be responsible to make good and remedy at his own expenses within such period as may be stipulated by the Engineer-in-charge, any defect which may develop or may be noticed before the expiry of the maintenance period of six months or as stipulated in NIT hereto from the certified date of completion and intimation of which has been sent to the contractor within seven days of the expiry of the said period by a letter sent by hand delivery or by registered post or Email. If contractor fails to attend to the above, defect will be rectified at contractor's risk & cost and same will be deducted from the security deposit/payable amounts available with BHEL.

1.11. ***BANK GUARANTEES***

Where ever Bank Guarantees are to be furnished/submitted by the contractor, the following shall be complied with

i) Bank Guarantees shall be from Scheduled Banks / Public Financial Institutions as defined in the Companies Act.

ii) The Bank Guarantees shall be as per prescribed BHEL formats.

iii) It is the responsibility of the bidder to get the Bank Guarantees revalidated/extended for the required period (subject to a minimum period of six months), as per the advice of BHEL. BHEL shall not be liable for issue of any reminders regarding expiry of the Bank Guarantees.

iv) In case extension/further extensions of any Bank Guarantees are not required, the bidders shall ensure that the same is explicitly endorsed by BHEL

v) In case the Bank Guarantees are not extended before the expiry date, BHEL reserves the right to invoke the same by informing the concerned Bank in writing, without any advance notice/communication to the concerned bidder.

vi) Bidders to note that any corrections to Bank Guarantees shall be done by the issuing Bank, only through an amendment in an appropriate non judicial stamp paper.

vii) The Original Bank Guarantee shall be sent directly by the Bank to BHEL under Registered Post (Acknowledgement Due).

1.12. VALIDITY OF OFFER

The rates in the Tender shall be kept open for acceptance for a minimum period of Ninety (90) DAYS from latest due date of offer submission (including extension, if any). In case BHEL calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the original offer which shall be binding on the tenderers.

1.13 EXECUTION OF CONTRACT AGREEMENT

The successful tenderer's responsibility under this contract commences from the date of issue of the Letter of Intent by BHEL. The Tenderer shall submit an unqualified acceptance to the Letter of Intent/Award within the period stipulated therein.

The successful tenderer shall be required to execute an agreement in the prescribed form, with BHEL, within fifteen days (15 days) after the acceptance of the Letter of Intent/Award, and in any case before releasing the first running bill. The contract agreement shall be signed by a person duly authorized/empowered by the tenderer. The expenses for preparation of agreement document shall be borne by Tenderer.

1.14. REJECTION OF TENDER AND OTHER CONDITIONS

1.14.1 The acceptance of tender will rest with BHEL which does not bind itself to accept the lowest tender or any tender and reserves to itself full rights for the following without assigning any reasons whatsoever:-

a. To reject any or all of the tenders.

b. To split up the work amongst two or more tenderers as per NIT

c. To award the work in part if specified in NIT

d. In case of either of the contingencies stated in (b) and (c) above, the time for completion as stipulated in the tender shall be applicable.

1.14.2 Conditional tenders, unsolicited tenders, tenders which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender conditions, specifications etc., are liable to be rejected.

1.14.3 Tenders are liable to be rejected in case of unsatisfactory performance of the tenderer with BHEL, or tenderer under suspension (hold/banning /delisted) by any unit / region / division of BHEL or tenderers who do not comply with the latest guidelines of Ministry/Commissions of Govt of India. BHEL reserves the right to reject a bidder in case it is observed that they are overloaded and may not be in a position to execute this job. The decision of BHEL will be final in this regard.

1.14.4 If a tenderer who is a proprietor expires after the submission of his tender or after the acceptance of his tender, BHEL may at their discretion, cancel such tender. If a partner of a firm expires after the submission of tender or after the acceptance of the tender, BHEL may then cancel such tender at their discretion, unless the firm retains its character.

1.14.5 BHEL will not be bound by any Power of Attorney granted by changes in the composition of the firm made subsequent to the execution of the contract. They may, however, recognize such power of Attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the contractor concerned.

1.14.6 If the tenderer deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money/Security Deposit/any other money due.

1.14.7 Canvassing in any form in connection with the tenders submitted by the Tenderer shall make his offer liable to rejection.

1.14.8 In case the Proprietor, Partner or Director of the Company/Firm submitting the Tender, has any relative or relation employed in BHEL, the authority inviting the Tender shall be informed, along with the Offer. Failing to do so, BHEL may, at its sole discretion, reject the tender or cancel the contract and forfeit the Earnest Money/Security Deposit.

1.14.9 The successful tenderer should not sub-contract part or complete work detailed in the tender specification undertaken by him without written permission of BHEL's Construction Manager/Site Incharge. The tenderer is solely responsible to BHEL for the work awarded to him.

1.14.10 The Tender submitted by a techno commercially qualified tenderer shall become the property of BHEL who shall be under no obligation to return the same to the bidder. However unopened price bids and late tenders shall be returned to the bidders after finalization of contract.

1.14.11 Unsolicited discount received after the due date and time of Bid Submission shall not be considered for evaluation. However, if the party who has submitted the unsolicited discount/rebate becomes the L-I party, then the awarded price i.e contract value shall be worked out after considering the discount so offered.

1.14.12 BHEL shall not be liable for any expenses incurred by the bidder in the preparation of the tender irrespective of whether the tender is accepted or not.

1.15 ***BHEL Fraud Prevention Policy :***

The bidder along with its associate/ collaborators/sub-contractors/ Sub-Vendors/ Consultants/service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice. Fraud prevention policy and list of Nodal officers shall be hosted on BHEL website, vendor portals of Units/Regions Internet.

CHAPTER-2

2.1 DEFINITION: The following terms shall have the meaning hereby assigned to them except where the context otherwise requires

i) BHEL shall mean Bharat Heavy Electricals Limited, a company registered under Companies Act 1956, with its Registered Office at BHEL HOUSE, SIRI FORT, NEW DELHI – 110 049, or its Authorised Officers or its Site Engineers or other employees authorised to deal with any matters with which these persons are concerned on its behalf.

ii) "EXECUTIVE DIRECTOR" or 'GROUP GENERAL MANAGER' or "GENERAL MANAGER (Incharge)" or "GENERAL MANAGER" shall mean the Officer in Electronics Division, Mysore road, Bengaluru-560026

iii) "COMPETENT AUTHORITY" shall mean Executive Director or Group General Manager or General Manager (In-charge) or General Manager or BHEL Officers who are empowered to act on behalf of the Executive Director or General Manager (In-charge) or General Manager of BHEL.

iv) "ENGINEER" or "ENGINEER IN CHARGE" shall mean an Officer of BHEL as may be duly appointed and authorized by BHEL to act as "Engineer" on his behalf for the purpose of the Contract, to perform the duty set forth in this General Conditions of Contract and other Contract documents. The term also includes 'CONSTRUCTION MANAGER' or 'SITE INCHARGE' as well as Officers

v) "SITE" shall mean the places or place at which the plants/equipment are to be erected and services are to be performed as per the specification of this Tender.

vi) "CLIENT OF BHEL" or "CUSTOMER" shall mean the project authorities with whom BHEL has entered into a contract for supply of equipment or provision of services.

vii) "CONTRACTOR" shall mean the successful Bidder/Tenderer who is awarded the Contract and shall include the Contractor's successors, heirs, executors, administrators and permitted assigns.

viii) "CONTRACT" or "CONTRACT DOCUMENT" shall mean and include the Work Order, Contract Agreement, the accepted appendices of Rates, Schedules, Quantities if any, General Conditions of Contract, Special Conditions of Contract, Instructions to the Tenderers, Drawings, Technical Specifications, the Special Specifications if any, the Tender documents, subsequent amendments mutually agreed upon and the Letter of Intent/Acceptance issued by BHEL. Any conditions or terms stipulated by the contractor in the tender documents or subsequent letters shall not form part of the contract unless, specifically accepted in writing by BHEL in the Letter of Intent/Award and incorporated in the agreement.

ix) "GENERAL CONDITIONS OF CONTRACT" shall mean the 'Instructions to Tenderers' and 'General Conditions of Contract' pertaining to the work for which above tenders have been called for.

x) "TENDER SPECIFICATION" or "TENDER" or "TENDER DOCUMENTS" shall mean General Conditions, Common Conditions, Special Conditions, Price Bid, Rate Schedule, Technical Specifications, Appendices, Annexures, Corrigendum's, Amendments, Forms, procedures, Site information, etc and drawings/documents pertaining to the work for which the tenderers are required to submit their offers. Individual specification number will be assigned to each Tender Specification.

xi) "LETTER OF INTENT" shall mean the intimation by a Post/Fax/email to the tenderer that the tender has been accepted in accordance with provisions contained in the letter. The responsibility of the contractor commences from the date of issue of this letter and all terms and conditions of the contract are applicable from this date.

xii) "COMPLETION TIME" shall mean the period by 'date/month' specified in the 'Letter of Intent/Award' or date mutually agreed upon for handing over of the intended scope of work, the erected equipment/plant which are found acceptable by the Engineer, being of required standard and conforming to the specifications of the Contract.

xiii) "PLANT" shall mean and connote the entire assembly of the plant and equipment's covered by the contract.

xiv) "EQUIPMENT" shall mean equipment, machineries, materials, structural, electrical and other components of the plant covered by the contract.

xv) "TESTS" shall mean and include such test or tests to be carried out on the part of the contractor as are prescribed in the contract or considered necessary by BHEL, in order to ascertain the quality, workmanship, performance and efficiency of the contractor or part thereof.

xvi) "APPROVED", "DIRECTED" or "INSTRUCTED" shall mean approved, directed or instructed by BHEL.

xvii) "WORK or CONTRACT WORK" shall mean and include supply of all categories of labour, specified consumables, tools and tackles and Plants required for complete and satisfactory site transportation, handling, stacking, storing, erecting, testing and commissioning of the equipment's to the entire satisfaction of BHEL.

xviii) "SINGULAR AND PLURALS ETC" words carrying singular number shall also include plural and vice versa, where the context so requires. Words imparting the masculine Gender shall be taken to include the feminine Gender and words imparting persons shall include any Company or Associations or Body of Individuals, whether incorporated or not.

xix) "HEADING" – The heading in these General Conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken as instructions thereof or of the contract.

xx) "MONTH" shall mean calendar month unless otherwise specified in the Tender.

xxi) Day' or 'Days' unless herein otherwise expressly defined shall mean calendar day or days of twenty four (24) hours each. A week shall mean continuous period of seven (7) days.

xxii) "COMMISSIONING" shall mean the synchronization testing and achieving functional operation of the Equipment with associated system after all initial adjustments, trials, cleaning, re-assembly required at site if any, have been completed and Equipment with associated system is ready for taking into service.

xxiii) "WRITING" shall include any manuscript type written or hand written or printed statement or electronically transmitted messages, under the signature or seal or transmittal of BHEL.

xxiv) "TEMPORARY WORK" shall mean all temporary works for every kind required in or for the execution, completion, maintenance of the work.

xxv) 'CONTRACT PRICE' or 'CONTRACT VALUE' shall mean the sum including applicable taxes mentioned in the LOI/LOA/Contract Agreement subject to such additions thereto or deductions there from as may be made under provisions hereinafter contained

xxvi) "COMMENCEMENT DATE" or "START DATE" shall mean the commencement/start of work at Site as per terms defined in the Tender

xxvii) "SHORT CLOSING" or "FORE CLOSING" of Contract shall mean the premature closing of Contract, for reasons not attributable to the contractor and mutually agreed between BHEL and the contractor

xxviii) "TERMINATION" of Contract shall mean the pre mature closing of contract due to reasons as mentioned in the contract

2.2 LAW GOVERNING THE CONTRACT AND COURT JURISDICTION

The contract shall be governed by the Law for the time being in force in the Republic of India. The Civil Court having original Civil Jurisdiction at Bengaluru, shall alone have exclusive jurisdiction in regard to all claims in respect of the Contract. No other Civil Court shall have jurisdiction in case of any dispute, under this contract

2.3 ISSUE OF NOTICE

2.3.1 Service of notice on contractor: Any notice to be given to the Contractor under the terms of the contract shall be served by sending the same by Registered Post / Speed Post / FAX / Email to or leaving the same at the Contractor's last known address of the principal place of business (or in the event of the contractor being a company, to or at its Registered Office). In case of change of address, the notice shall be served at changed address as notified in writing by the Contractor to BHEL. Such posting or leaving of the notice shall be deemed to be good service of such notice and the time mentioned to the condition for doing any act after notice shall be reckoned from the date so mentioned in such notice.

2.3.2 Service of notice on BHEL Any notice to be given to BHEL in-charge under the terms of the Contract shall be served by sending the same by post or Email or leaving the same at BHEL address or changed address as notified in writing by BHEL to the Contractor.

2.4 USE OF LAND

No land belonging to BHEL or their Customer under temporary possession of BHEL shall be occupied by the contractor without written permission of BHEL.

2.4.1 STORES AND MATERIALS:

The contractor shall, at his own expense, supply all stores and materials required for the contract, other than those which may be provided by BHEL at the rates detailed therein subject to their availability at the place of issue indicated therein. All stores and materials to be supplied by the Contractor shall be of the best kind as described in the Specifications and the Contractor shall, if required by the Engineer –in- charge furnish him with proof to his satisfaction that the store and materials so comply with the specifications.

The contractor shall, at his own expense and without delay, supply samples of stores and materials proposed to be used in the execution of the work for the approval of the Engineer-in charge, who may reject all stores and materials not corresponding either in quality or character to the approved samples.

In the case of stores provided by BHEL, the Contractor shall bear the cost of loading, transporting to site, unloading, storing under cover as required, assembling & jointing the several parts together as necessary and incorporating & fixing these stores & materials in the work, including all preparatory work of whatever description that may be required, and closing, preparing, loading and returning empty cases or containers to the place of issue without any extra charges.
Contractor is responsible for safe & secure storage of above material.

2.4.2 PATENT RIGHTS:

The contractor shall fully indemnify BHEL, or the agent, servant, or employee of BHEL, against any action, claim or proceeding relating to infringement or the use of any patent or design or any alleged patent or design rights, and shall pay any royalties which may be payable in respect of any article/ or part thereof included in the contract.

In the event of any claims being made or action brought against BHEL, or any agent, or servant or employee of BHEL., in respect of any of the matters aforesaid, the contractor shall not apply when such increment has taken place in complying with the specific directions issued by the BHEL but the contractor shall pay any royalties payable in respect of any such use.

2.4.3 WATER :

The contractor shall allow in his tender and provide at his cost all water required for the work or his employees on the work, together with all pipes and fittings or other means that may be necessary or required to ensure a proper and ample supply of water for all purpose connected with the work.

In the event of a provision existing in the Tender documents for supply of water on payment by BHEL, water will be supplied from the BHEL supply System, or other sources at any points fixed by the Site Engineer/ Engineer-in-charge on the site of work. The contractor shall make necessary arrangement for lifting, pumping, carrying or conveying the water as required at his own cost. The levy of water charges to be borne by the Contractor in such case shall be specifically mentioned in the Tender documents.

2.4.4 TEMPORARY WORKSHOPS, STORES ETC :

The Contractor shall, during the progress of the work provide, erect and maintain at his own expense all necessary temporary workshops, store, offices, toilets etc., required for the proper and efficient execution of the work. The planning, siting and erection of these building shall have the approval of the Engineer-in-charge and the Contractor shall at all times keep them in a clean and sanitized condition to the entire satisfaction of the Engineer-in-charge.

On completion of the work all such temporary buildings shall be cleared and the site restored to its original state in a clean and tidy condition to the entire satisfaction of the Engineer-in-charge.

2.5 COMMENCEMENT OF WORK

2.5.1 Time is essence of contract and is specified in the tender document or in each individual work order.

2.5.2 The contractor shall commence the work within seven(07) days from LOI/work order or as intimated by BHEL and shall proceed with the same with due expedition without delay.

2.5.3 If the contractor fails to start the work within stipulated time as per LOI or as intimated by BHEL, then BHEL at its sole discretion will have the right to cancel the contract. The Earnest Money and/or Security Deposit with BHEL will stand forfeited without any further reference to him without prejudice to any and all of BHEL's other rights and remedies in this regard.

2.5.4 All the work shall be carried out under the direction and to the satisfaction of BHEL.

2.6 ***MEASUREMENT OF WORK AND MODE OF PAYMENT:***

2.6.1 All payments due to the contractors shall be made by electronic mode only, unless otherwise found operationally difficult.

2.6.2 For progress running bill payments: - The Contractor shall present detailed measurement sheets in triplicate, duly indicating all relevant details based on technical documents and connected drawings for work done during the month/period under various categories in line with terms of payment as per contract. The basis of arriving at the quantities, weights shall be relevant documents and drawings released by BHEL. These measurement sheets shall be prepared jointly with BHEL Engineers and signed by both the parties.

2.6.3 These measurement sheets will be checked by BHEL Engineer and quantities and percentage eligible for payment under various groups shall be decided by BHEL Engineer. The abstract of quantities and percentage so arrived at based on the terms of payment shall be entered in Measurement Book and signed by both the parties.

2.6.4 Based on the above quantities, contractor shall prepare the bills in prescribed format and work out the financial value. These will be entered in Measurement Book and signed by both the parties. Payment shall be made by BHEL after effecting the recoveries due from the contractor.

2.6.5 All recoveries due from the contractor for the month/period shall be effected in full from the corresponding running bills unless specific approval from the competent authorities is obtained to the contrary.

2.6.6 Measurement shall be restricted to that portion of work for which it is required to ascertain the financial liability of BHEL under this contract.

2.6.7 The measurement shall be taken jointly by persons duly authorized on the part of BHEL and by the Contractor.

2.6.8 The Contractor shall bear the expenditure involved if any, in making the measurements and testing of materials to be used/used in the work. The contractor shall, without extra charges, provide all the assistance with appliances and other things necessary for measurement.

2.6.9 If at any time due to any reason whatsoever, it becomes necessary to re-measure the work done in full or in part, the expenses towards such re measurements shall be borne by the contractor unless such re measurements are warranted solely for reasons not attributable to contractor.

2.6.10 Passing of bills covered by such measurements does not amount to acceptance of the completion of the work measured. Any left out work has to be completed, if pointed out at a later date by BHEL.

2.6.11 Final measurement bill shall be prepared in the final bill format prescribed for the purpose based on the certificate issued by BHEL Engineer that entire works as stipulated in tender specification has been completed in all respects to the entire satisfaction of BHEL. Contractor shall give unqualified "No Claim" Certificate. All the tools and tackles loaned to him should be returned in satisfactory condition to BHEL. The abstract of final quantities and financial values shall also be entered in the Measurement Books and signed by both parties to the contract. The Final Bill shall be prepared and paid within a reasonable time after completion of work.

*2.7 **RIGHTS OF BHEL***

BHEL reserves the following rights in respect of this contract during the original contract period or its extensions if any, as per the provisions of the contract, without entitling the contractor for any compensation.

2.7.1 To withdraw any portion of work and/or to restrict/alter quantum of work as indicated in the contract during the progress of work and get it done through other agencies to suit BHEL's commitment to its customer or in case BHEL decides to advance the date of completion due to other emergent reasons/ BHEL's obligation to its customer.

2.7.2 To terminate the contract or get any part of the work done through other agency or deploy BHEL's own/hired/otherwise arranged resources , at the risk and cost of the contractor after due notice of a period of two weeks by BHEL, in the event of:-

i) Contractor's continued poor progress

ii) Withdrawal from or abandonment of the work before completion of the work

iii) Contractor's inability to progress the work for completion as stipulated in the contract

iv) Poor quality of work

v) Corrupt act of Contractor

vi) Insolvency of the Contractor

vii) Persistent disregard to the instructions of BHEL

viii) Assignment, transfer, sub-letting of contract without BHEL's written permission

ix) Non fulfillment of any contractual obligations / non-compliance of statutory requirements

x) In the opinion of BHEL, the contractor is overloaded and is not in a position to execute the job as per required schedule

2.7.3 To meet the expenses including BHEL overheads of 35% & Liquidated damage/penalties arising out of "Risk & Cost" as explained above under Sl.No. 2.7.2. BHEL shall recover the amount from any money due from Contractor, from any money due to the Contractor including Security Deposit or by forfeiting any T&P or material of the contractor under this contract or any other contract of BHEL or by any other means or any combination thereof

2.7.4 To terminate the contract or to restrict the quantum of work and pay for the portion of work executed in case BHEL's contract with their customer are terminated for any reason, as per mutual agreement.

2.7.5 To effect recovery from any amounts due to the contractor under this or any other contract or in any other form, the moneys BHEL is statutorily forced to pay to anybody, due to contractor's failure to fulfill any of his obligations. BHEL shall levy overheads of 35% on all such payments.

2.7.6 While every endeavor will be made by BHEL to this end, they cannot guarantee uninterrupted work due to conditions beyond their control. The Contractor will not be normally entitled for any compensation/extra payment on this account unless otherwise specified elsewhere in the contract.

2.7.7 In case the execution of works comes to a complete halt or reaches a stage wherein worthwhile works cannot be executed and there is no possibility of commencement of work for a period of not less than two months, due to reasons not attributable to the contractor and other than Force Majeure conditions, BHEL may consider permitting the contractor to de mobilize forthwith and re mobilize at an agreed future date. Cost of such demobilization/remobilization shall be mutually agreed. ORC (Over run Charges) in such cases shall not be applicable for the period between the period of demobilization and re mobilisation. The duration of contract/time extension shall accordingly get modified suitably. In case of any conflict, BHEL decision in this regard shall be final and binding on the contractor.

2.7.8 In the unforeseen event of inordinate delay in receipt of materials, drawings, fronts, etc, due to which inordinate discontinuity of work is anticipated, BHEL at its discretion may consider contractor's request to short close the contract, provided that the balance works are minor vis a vis the scope of work envisaged as per the contract. At the point of requesting for

short closure, contractor shall establish that he has completed all works possible of completion and he is not able to proceed with the balance works due to constraints beyond his control. In such a case, the estimated value of the unexecuted portion of work as mutually agreed, shall however be reduced from the final contract value.

2.7.9 ***LIQUIDATED DAMAGES/PENALTY***

COMPENSATION FOR DELAY:

If the contractor fails to maintain the required progress in terms of condition 2.10 or to complete the work and clear the site on or before the contracted or extended the period of completion, he shall, without prejudice to any other right or remedy of the BHEL on account of such breach, pay as agreed compensation an amount calculated as stipulated below

For unfinished anticipated value of work where finished portion is fit for use

Rate of compensation as follows:

- *Completion period (as originally stipulated)not exceeding 6 months. ……@ 1 percent per week*
- *Completion period (as originally stipulated) Exceeding 6 months and not exceeding 2 years…@ 0.5 percent per week*
- *Completion period (as originally stipulated) exceeding 2 years…… @ 0.25 percent per week*

Provided always that the total amount of compensation for delay to be paid under condition shall not exceed the under noted percentage of the anticipated contract value

- *Completion period (as originally stipulated) not exceeding 6 months. ……@ 10 percent of anticipated value of work*
- *Completion period (as originally stipulated)Exceeding 6 months and not exceeding 2 years…@ 7.5 percent of anticipated value of work*
- *Completion period (as originally stipulated)Exceeding 2 years……..@ 5 percent of anticipated value of work*

The amount of compensation may be adjusted or set off against any sum payable to the Contractor under this or any other contract with the BHEL.

2.7.10 ***POST TECHNICAL AUDIT OF WORK AND BILLS****: BHEL reserve the right to carry out a post-payment audit and technical examination of the work and final bill including all supporting vouchers, abstract etc., and to enforce recovery of any sums becoming due as a result thereof in the manner provided in the proceeding sub-paragraph's provided however that no such recovery shall be enforced after three years of passing the final bill*

2.8 RESPONSIBILITIES OF THE CONTRACTOR IN RESPECT OF LOCAL LAWS, EMPLOYMENT OF WORKERS ETC.

The following are the responsibilities of the contractor in respect of observance of local laws, employment of personnel, payment of taxes etc. The subcontractor shall fully indemnify BHEL against any claims of whatsoever nature arising due to the failure of the contractor in discharging any of his responsibilities hereunder:

2.8.1 The contractor at all times during the continuance of this contract shall, in all his dealings with local labour for the time being employed on or in connection with the work, have due regard to all local festivals and religious and other customs.

2.8.2 The contractor shall comply with all applicable State and Central Laws, Statutory Rules, Maternity act, Regulations etc. such as contract labour(R&A) Act 1970, Minimum wage Act 19748, Payment of wages Act 1936,ESI Act 1948, EPF Act 1952, Employees' compensation Act 1923, Provision of Companies Act 1948 & rules thereof, The interstate Migrant Workmen 1979, The Karnataka Factories Rules 1969, Payment of Bonus Act 1965, Payment of Gratuity Act 1972. Child labour Prohibition act 1986, Karnataka Minimum Wage Act , Prevention of sexual harassment at work place Act 2013, Guidelines/notification related to Safai Karamchari Act , Equal Remuneration Act 1976, The company's instructions as issued from time to time in regard to working hours, wages, leaves, holidays etc. for labour as may be enacted by the Government during the tenure of the Contract and having force or jurisdiction at Site. The Contractor shall also give to the local Governing Body, Police and other relevant Authorities all such notices as may be required by the Law.

The contractor shall produce the following registers and forms:

- *Form XIII- Register of work men employed by contractor(Rule 75)*
- *Form XIV- Employment Card issued by contractor(Rule 76)*
- *Form XVI- Muster Roll (Rule 78(1) (a)(i))*
- *Form XVII- Register of Wages (Rule 78(1) (a)(i))*
- *Form XVIII- Register of wages cum Muster Roll(in case of weekly payment)*
- *Form XIX- Wage slip (Rule 78(b))*
- *Form XX- Register of deduction for damages Or Loss Rule 78(1) (a)(ii))*
- *Form XXI- Register of files Rule 78(1) (a)(ii))*
- *Form XXII- Register of Advance Rule 78(1) (a)(ii))*
- *Form XXIII- Register of Overtime Rule 78(1) (a)(iii))*
- *Form XXIV- Return to be sent by the contractor to the Licensing officer (Rule 82(1))*

2.8.3 The contractor shall obtain independent License under the Contract Labour (Regulations and Abolition Act)as required from the concerned Authorities based on the certificate (Form-V) issued by the Principal Employer/Customer

2.8.4 The contractor shall pay all taxes, fees, license charges, deposits, duties, tolls, royalties, commission or other charges which may be levied on account of his operations in executing the contract.

2.8.5 While BHEL would pay the inspection fees and Registration fees of Boiler & explosive/Electrical Inspectorate, all other arrangements for site visits periodically by the Inspectorate to site, Inspection certificate etc. will have to be made by contractor. However, BHEL will not make any payment to the Inspectorate in connection with contractor's Welders/Electricians qualification tests etc.

2.8.6 Contractor shall be responsible for provision of Health and Sanitary arrangements (more particularly described in Contract Labour Regulation & Abolition Act), Safety precautions etc. as may be required for safe and satisfactory execution of contract.

2.8.7 The contractor shall be responsible for proper accommodation including adequate medical facilities for personnel employed by him.

2.8.8 The contractor shall be responsible for the proper behavior and observance of all regulations by the staff employed by him.

2.8.9 The contractor shall ensure that no damage is caused to any person/property of other parties working at site. If any such damage is caused, it is responsibility of the contractor to make good the losses or compensate for the same.

2.8.10 All the properties/equipment/components of BHEL/their Client loaned with or without deposit to the contractor in connection with the contract shall remain properties of BHEL/their Client.

2.8.11 The contractor shall use such properties for the purpose of execution of this contract. All such properties/equipment/components shall be deemed to be in good condition when received by the contractor unless he notifies within 48 hours to the contrary. The contractor shall return them in good condition as and when required by BHEL/their Client. In case of non-return, loss, damage, repairs etc, the cost thereof as may be fixed by BHEL Engineer will be recovered from the contractor

2.8.12 Any delay in completion of works/or non-achievement of periodical targets due to the reasons attributable to the contractor, the same may have to be compensated by the contractor either by increasing manpower and resources or by working extra hours and/or by working more than one shift. All these are to be carried out by the contractor at no extra cost.

2.8.13 The contractor shall arrange, coordinate his work in such a manner as to cause no hindrance to other agencies working in the same premises.

2.8.14 All safety rules and codes applied by the Client/BHEL at site shall be observed by the contractor without exception. The contractor shall be responsible for the safety of the equipment/material and works to be performed by him and shall maintain all light, fencing guards, slings etc. or other protection necessary for the purpose. Contractor shall also take such additional precautions as may be indicated from time to time by the Engineer with a view to prevent pilferage, accidents, fire hazards. Due precautions shall be taken against fire hazards and atmospheric conditions. Suitable number of Clerical staff, watch and ward, store keepers to take care of equipment/materials and construction tools and tackles shall be posted at site by the contractor till the completion of work under this contract. The contractor shall arrange for such safety devices as are necessary for such type of work and carry out the requisite site tests of handling equipment, lifting tools, tackles etc. as per prescribed standards and practices. Contractor has to ensure the implementation of Health, Safety and Environment (HSE) requirements as per directions given by BHEL/Customer. The contractor has to assist in HSE audit by BHEL/Customer and submit compliance Report. The contractor has to generate and submit record/reports as per HSE plan/activities as per instruction of BHEL/Customer. All tools, plant and equipment brought to the site shall become the property of BHEL and shall not be removed from the site without the prior written approval from BHEL. When the work is finally completed or the Contractor is determined for reasons other than the defaults of the contract, he shall forthwith remove from the site all tools, plants, equipment etc., (other than those as may have been provided by BHEL) and upon such removal, the same shall revert in, and become the property of the contractor.

2.8.15 The contractor will be directly responsible for payment of wages to his workmen on specified date of respective month declared as per applicable Labour Act. A pay roll sheet giving all the payments given to the workers and duly signed by the contractor's representative should be furnished to BHEL site for record purpose.

2.8.16 In case of any class of work for which there is no such specification as laid down in the contract, such work shall be carried out in accordance with the instructions and requirements of the Engineer.

2.8.17 Also, no idle charges will be admissible in the event of any stoppage caused in the work resulting in contractor's labour and Tools & Plants being rendered idle due to any reason at any time.

2.8.18 The contractor shall take all reasonable care to protect the materials and work till such time the plant/equipment has been taken over by BHEL or their Client whichever is earlier.

2.8.19 The contractor shall not stop the work or abandon the site for whatsoever reason of dispute, excepting force majeure conditions. All such problems/disputes shall be separately discussed and settled without affecting the progress of work. Such stoppage or abandonment shall be treated as breach of contract and dealt with accordingly

2.8.20 The contractor shall keep the area of work clean and shall remove the debris etc. while executing day-to-day work. Upon completion of work, the contractor shall remove from the vicinity of work, all scrap, packing materials, rubbish, unused and other materials and deposit them in places specified by the Engineer. The contractor will also demolish all the hutments, sheds, offices, etc. constructed and used by him and shall clean the debris. In the event of his failure to do so, the same will be arranged to be done by the Engineer and the expenses recovered from the contractor. If the work is executed in Factory premises, no hutment will be allowed.

2.8.21 The contractor shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and timely execution shall be the essence of this contract. The contractor shall be responsible to ensure that the quality, assembly and workmanship conform to the dimensions and clearance given in the drawings and/ or as per the instructions of the Engineer.

2.8.22 The Contractor to note that some of BHEL's T&Ps/MMDs may not be insured. The Contractor will take necessary precautions and due care to protect the same while in his custody from any damage/ loss till the same is handed over back to BHEL. In case the damage / loss is due to carelessness/ negligence on the part of the contractor, the Contractor is liable to get them repair/ replaced immediately and in case of his failure to do so within a reasonable time, BHEL will reserve the right to recover the loss from the contractor.

2.8.23 The contractor shall provide all watchmen necessary, for the protection of the site, the work, the materials, the tools , plant, equipment and anything else lying on the site during the progress of the work. He shall solely be responsible for and shall take all reasonable and proper steps for protecting, securing , lighting and watching all places on or about the work and the site which may be dangerous to any person whom so ever.

2.8.24 SITE DRAINAGE: All water that may accumulate on the site during the process of the work, or in trenches and excavations shall be removed to the entire satisfaction of the Engineer-in-charge and at Contractors expense.

2.8.25 INSPECTION OF THE WORK: BHEL Officers concerned with the Contract shall have power at any time to inspect and examine any part of the work and the contractor shall give such facilities as may be required to given for such inspection and examination.

2.8.26 In case the contractor is required to undertake any work outside the scope of this contract, the rates payable shall be those mutually agreed upon if the item rates are not mentioned in existing contract

i. For any item of wok required to be carried out after the contract has been awarded and which is not covered by Contractors Schedule but is covered by C.P.W.D. schedule of rates the rate payable for such a fresh item will be derived from updated C.P.W.D. schedule of rates by the method of proportion as follows:

ii. *Rate as per estimated updated C.P.W.D DSR and loading tender excess (plus or minus) on pro–rata basis for nearest analogous items. For other items rate as per estimated C.P.W.D DSR and loading tender excess(plus or minus)*

iii. *If rates are not available in C.P.W.D. DSR, deviated item rates will be derived from market rate with 15% profit and overheads.*

2.9 ***PROGRESS MONITORING, MONTHLY REVIEW AND PERFORMANCE EVALUATION***

2.9.1 A detailed plan/programme for completion of the contractual scope of work as per the time schedule given in the contract shall be jointly agreed between BHEL and Contractor, before commencement of work . The above programme shall be supported by month wise deployment of resources viz Manpower, T&P, Consumables, etc. Progress will be reviewed periodically (Daily/Weekly/Monthly) vis a vis this jointly agreed programme. The Contractor shall submit periodical progress reports (Daily/Weekly/Monthly) and other reports/information including manpower, consumables, T&P mobilization etc as desired by BHEL.

2.9.2 Monthly progress review between BHEL and Contractor shall be based on the agreed programme as above, availability of inputs/fronts etc, and constraints if any, as per prescribed formats. Manpower, T&P and consumable reports as per prescribed formats shall be submitted by contractor every month. Release of RA Bills shall be contingent upon certification by BHEL Site Engineer of the availability of the above prescribed formats duly filled in and signed.

2.9.3 The burden of proof that the causes leading to any shortfall is not due to any reasons attributable to the contractor is on the contractor himself. The monthly progress review shall record shortfalls attributable to (i) Contractor, (ii) Force Majeure Conditions, and (iii) BHEL

2.10 ***TIME OF COMPLETION***

2.10.1 Time is essence of the contract. The time schedule shall be as prescribed in the Contract. The time for completion shall be reckoned from the date of commencement of work at Site as certified by BHEL Engineers

2.10.2 The entire work shall be completed by the contractor within the time schedule or within such extended periods of time as may be allowed by BHEL under clause 2.11

2.11 ***EXTENSION OF TIME FOR COMPLETION***

2.11.1 If the completion of work as detailed in the scope of work gets delayed beyond the contract period, the contractor shall request for an extension of the contract and BHEL at its discretion may extend the Contract.

2.11.2 Based on the monthly reviews jointly signed, the works balance at the end of original contract period less the backlog attributable to the contractor shall be quantified, and the number of months of 'Time extension' required for completion of the same shall be jointly worked out. Within this period of 'Time extension', the contractor is bound to complete the portion of backlog attributable to the contractor. Any further 'Time extension' or 'Time extensions' at the end of the previous extension shall be worked out similarly.

2.11.3 However if any 'Time extension' is granted to the contractor to facilitate continuation of work and completion of contract, due to backlog attributable to the contractor alone, then it shall be without prejudice to the rights of BHEL to impose penalty/LD for the delays attributable to the contractor, in addition to any other actions BHEL may wish to take at the risk and cost of contractor.

2.11.4 A joint programme shall be drawn for the balance amount of work to be completed during the period of 'Time Extension', along with matching resources (with weightages) to be deployed by the contractor as per specified format. Review of the programme and record of shortfall shall be done every month of the 'Time extension' period in the same manner as is done for the regular contract period.

2.11.5 During the period of 'Time extension', contractor shall maintain their resources as per mutually agreed program

2.11.6 At the end of total work completion as certified by BHEL Engineer, and upon analysis of the total delay, the portion of time extensions attributable to (i) Contractor, (ii) Force majeure conditions, and (iii) BHEL, shall be worked out and shall be considered to be exhausted in the same order. The total period of time extensions shall be the sum of (i), (ii) and (iii) above and shall be equal to period between the scheduled date of completion and the actual date of completion of contract. LD shall be imposed/levied for the portion of time extensions attributable to contractor and recoverable from the dues payable to the contractor.

2.12 ***OVERRUN COMPENSATION (THIS CLAUSE IS NOT APPLICABLE IN BHEL FACTORY & TOWNSHIP PREMISES)***

2.12.1 Over Run Compensation (ORC) is payable by way of rate revisions for periods beyond original, contract period subject to the following terms and conditions.

2.12.2 Rates shall be increased by 10% for the first twelve months of one or more extensions beyond original contract period. For the next twelve months of further extensions if any, rates shall be increased as above by 10% over the previous twelve months, and similarly for each subsequent twelve months extension.

2.12.3 Should there be any 'Time extension' for reasons attributable only to the contractor, then the work shall be executed by the contractor at the rates applicable for the period the work was planned

2.12.4 Payment of ORC shall be regulated as follows:

i) Contractor is entitled to Over Run Compensation (ORC) only for the portion of backlog attributable to BHEL.

ii) 50% of the compensation is allocated for deployment of resources agreed as per the joint programme drawn vide 2.11.4. Payment shall however be based on the actual deployment of resources for the month as certified by BHEL, as per weightages assigned therein

iii) 50% of the compensation, is allocated for achieving of planned progress agreed as per the joint programme drawn vide 2.11.4. Payment shall be on pro rata basis for actual achieved quantities

iv) Total Over Run Compensation shall be limited to 10% of the executed contract value as certified in Final Bill. For this purpose executed contract value excludes PVC, ORC, Supplementary/Additional Items and Extra Works done on Man-day rate basis

2.12.5 Contractor shall not be entitled for any Over Run Compensation (ORC) for the portion of backlog attributable to the contractor. Such works shall be executed at the rates applicable for the period the work was planned

2.13 ***QUANTITY VARIATION***

2.13.1 The quoted rates shall remain firm irrespective of any variations in the individual quantities.

2.14 ***EXTRA WORKS***

2.14.1 All rectifications/modifications, revamping, and reworks required for any reasons not attributable to the contractor, or needed due to any change in deviation from drawings and design of equipment, operation/maintenance requirements, mismatching, or due to damages in transit, storage and erection/commissioning, and other allied works which are not very specifically indicated in the drawings, but are found essential for satisfactory completion of the work, will be considered as extra works.

2.14.2 Extra works arising on account of the contractor's fault, irrespective of time consumed in rectification of the damage/loss, will have to be carried out by the contractor free of cost. Under such circumstances, any material and consumable required for this purpose will also have to be arranged by the contractor at his cost.

2.14.3 All the extra work should be carried out by a separately identifiable gang, without affecting routine activities. Daily log sheets in the pro-forma prescribed by BHEL should be maintained and shall be signed by the contractor's representative and BHEL engineer. No claim for extra work will be considered/entertained in the absence of the said supporting documents i.e. daily log sheets. Signing of log sheets by BHEL engineer does not necessarily mean the acceptance of such works as extra works.

2.14.4 BHEL retains the right to award or not to award any of the major repair/ rework/modification/rectification/fabrication works to the contractor, at their discretion without assigning any reason for the same

2.14.5 After eligibility of extra works is established and finally accepted by BHEL engineer/designer, payment will be released on competent authority's approval at the following rate.

MAN-HOUR RATE FOR ELIGIBLE EXTRA WORKS: Single composite average labour man-hour rate, including overtime if any, supervision, use of tools and tackles and other site expenses and incidentals, consumables for carrying out any major rework/ repairs/ rectification/ modification/ fabrication as certified by site as may arise during the course of erection, testing, commissioning or extra works arising out of transit, storage and erection damages, payment , if found due will be as per applicable minimum wage act

2.14.6 The above composite labour man hour rate towards extra works shall remain firm and not subject to any variation during execution of the work. PVC will not be applicable for extra works. Rate revision, Over Run Charges/compensation etc will not be applicable due to extra works.

2.14.7 Extra Works for Civil Packages shall be regulated as follows

i) Rates for Extra Works arising due to (1) non availability of BOQ (Rate Schedule), OR (2) change in Specifications of materials/works (3) rectification/modification/dismantling & re erecting etc due to no fault of Contractor, shall be in the order of the following:

a) Item rates are to be derived from similar nature of items in the BOQ (Rate Schedule) with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities.

b) As per applicable updated CPWD-DSR (or latest edition) with applicable escalation derived, Notification issued by the office of CPWD for 'Cost Index' in that Region where the project is being executed,

c) Item rates are to be worked out on the basis of prevailing market rates mutually agreed between BHEL and Contractor, plus 15% towards Contractor's overheads and profit.

ii) PVC and ORC will not applicable be for (i) above.

2.15 ***SUPPLEMENTARY ITEMS***

2.15.1 For NON Civil Works

Supplementary items are items/works required for completion of entire work but not specified in the scope of work. Subject to certification of such items/works as supplementary items by BHEL Engineer, rates shall be derived on the basis of any one of the following on mutual agreement:

i) Based on percentage breakup/rates indicated for similar/nearby items

ii) In case (i) above does not exist, then BHEL/site may derive the percentage breakup/rates to suit the type of work

2.15.2 For Civil Works

i) Rates for Supplementary Works/Additional Works arising out due to additions/alterations in the original scope of works as per contract subject to certification of BHEL Engineer shall be worked out as under:

a) Item rates which are available in existing BOQ (Rate Schedule) shall be operated with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities

b) Items of works which are not available in existing BOQ shall be operated as an 'Extra Works' and rate shall be derived as per clause no 2.14

ii) Execution of Supplementary Works/Additional Works through the Contractor shall be at the sole discretion of BHEL, and shall be considered as part of executed contract value for the purpose of Quantity Variation as per clause 2.13

iii) BHEL Engineer's decision regarding fixing the rate as above is final and binding on the contractor.

iv) PVC and ORC will not be applicable for (i) above.

2.16 ***STRIKES & LOCKOUT***

2.16.1 The contractor will be fully responsible for all disputes and other issues connected with his labour/employee. In the event of the contractor's labour/employee resorting to strike or the Contractor resorting to lockout and if the strike or lockout declared is not settled within a period of 15 days, BHEL shall have the right to get the work executed through any other

agencies and the cost so incurred by BHEL along with Overhead charges of 35% shall be deducted from the Contractor's bills along with overhead of 35%

2.16.2 For all purposes whatsoever, the employees of the contractor shall not be deemed to be in the employment of BHEL

2.17 FORCE MAJEURE

The following shall amount to Force Majeure:-

2.17.1 Acts of God, act of any Government, War, Sabotage, Riots, Strike, Civil commotion, Police action, Revolution, Flood, Fire, Cyclones, Earth quake and Epidemic and other similar causes over which the contractor has no control.

2.17.2 If the contractor suffers delay in the due execution of the contractual obligation due to delays caused by force majeure as defined above, the agreed time of completion of the job covered by this contract or the obligations of the contractor shall be extended by a period of time equal to period of delay, provided that on the occurrence of any such contingency, the contractor immediately reports to BHEL in writing the causes of delay and the contractor shall not be eligible for any compensation.

2.18 ***ARBITRATION & RECONCILIATION***

2.18.1 In case amicable settlement is not reached in the event of any dispute or difference arising out of the execution of the Contract or the respective rights and liabilities of the parties or in relation to interpretation of any provision by the Contractor in any manner touching upon the Contract, such dispute or difference shall (except as to any matters, the decision of which is specifically provided for therein) be referred to the sole arbitration of the arbitrator appointed by BHEL/In charge.

The award of the Arbitrator shall be binding upon the parties to the dispute Subject as aforesaid, the provisions of Arbitration and Reconciliation Act 1996 (India) or statutory modifications or reenactments thereof and the rules made there under and for the time being in force shall apply to the arbitration proceedings under this clause. The venue of the arbitration shall be the place from which the contract is issued or such other place as the Arbitrator at his discretion may determine

2.18.2 In case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:

In the event of any dispute or difference relating to the interpretation and application of the provisions of the Contract, such dispute or difference shall be referred to by either party to the arbitration of one of the arbitrators in the department of public enterprises. The award of the arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make further reference for setting aside or revision of the award to the Law Secretary, Department of Legal Affairs, Ministry of Law and Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary or Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the parties hereto finally and conclusively.

2.18.3 The cost of arbitration shall be borne equally by the parties.

2.18.4 Work under the contract shall be continued during the arbitration proceedings

2.19 ***PAYMENTS***

Payments to Contractors are made in any one of the following forms

2.19.1 Running Account Bills (RA Bills)

i) These are for interim payments when the contracts are in progress. The bills for such interim payments are to be prepared by Contractor in prescribed formats (RA Bill forms).

ii) Payments shall be made according to the extent of work done as per measurements taken up to the end of the calendar month and in line with the terms of payments described in the Tender documents along with relevant statutory documents applicable for the work.

iii) Recoveries on account of electricity, water, statutory deductions, etc are made as per terms of contract

iv) Full rates for the work done shall be allowed only if the quantum of work has been done as per the specifications stipulated in the contract. If the work is not executed as per the stipulated specifications, BHEL may ask the contractor to re do the work according to the required specifications, without any extra cost. However, where this is not considered necessary 'OR' where the part work is done due to factors like non-availability of material to be supplied by BHEL 'OR' non availability of fronts 'OR' non availability of drawings, fraction payment against full rate, as is considered reasonable, may be allowed with due regard for the work remaining to be done. BHEL decision in this regard will be final and binding on the contractor.

v) In order to facilitate part payment, BHEL Site Engineer at his discretion may further split the contracted rates/percentages to suit site conditions, cash flow requirements according to the progress of work

2.19.2 Final Bill

Final Bill' is used for final payment on closing of Running Account for works or for single payment after completion of works. 'Final Bill' shall be submitted as per prescribed format after completion of works as per scope and upon material reconciliation, along with the following.

i) 'No Claim Certificate' by contractor

ii) Clearance certificates where ever applicable viz Clearance Certificates from Customer, various Statutory Authorities like Labour department, PF Authorities, Commercial Tax Department, etc

iii) Indemnity bond as per prescribed format BHEL shall settle the final bills after deducting all liabilities of Contractor to BHEL

2.20 ***PERFORMANCE GUARANTEE FOR WORKMANSHIP***

2.20.1 Even though the work will be carried out under the supervision of BHEL Engineers the Contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of as mentioned in the contract/NIT from the date of commencement of guarantee period as defined in Technical Conditions of Contract, for good workmanship and shall rectify free of cost all defects due to faulty erection detected during the guarantee period. In the event of the Contractor failing to repair the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs of such defective works at the Contractor's risk and cost, without prejudice to any other rights and recover the same from the balance security deposit.

2.20.2 BHEL shall release the balance security deposit subject to the following

i) Contractor has submitted 'Final Bill'

ii) Guarantee period as per contract has expired

iii) Contractor has furnished 'No Claim Certificate' in specified format

iv) BHEL Site Engineer/Construction Manager has furnished the 'No Demand Certificate' in specified format

v) Contractor has carried out the works required to be carried out by him during the period of Guarantee and all expenses incurred by BHEL on carrying out such works is included for adjustment from the Guarantee money refundable.

2.21 ***CLOSING OF CONTRACTS***

The Contract shall be considered completed and closed upon completion of all contractual obligations and settlement of Final Bill or completion of Guarantee period whichever is later. Upon closing of Contract, BHEL shall issue a completion certificate as per standard format, based on specific request of Contractor.

2.22 ***REVERSE AUCTION/PRICE BID OPENING:***

- *BHEL reserves the right to go for reverse auction at any point of time before opening of Price Bid.*
- *Bids with non-acceptance of reverse auction will be liable for rejection.*
- *Opening of Price Bid at discretion of BHEL.*
- *BHEL shall be at liberty to cancel the tender at any time, before ordering, without assigning any reason.*

2.23 ***SUSPENSION OF BUSINESS DEALINGS***

BHEL reserves the right to take action against Contractors who either fail to perform or Tenderers/Contractor who indulge in malpractices, by suspending business dealings with them in line with BHEL guidelines issued from time to time.

2.24 OTHER ISSUES

2.24.1 Value of Non judicial Stamp Paper for Bank Guarantees and for Contract Agreement shall be not less than Rs 200/- unless otherwise required under relevant statutes.

2.24.2 In case of any conflict between the General Conditions of Contract and Special Conditions of Contract, provisions contained in the Special Conditions of Contract shall prevail.

2.24.3 Unless otherwise specified in NIT, offers from consortium/JVs shall not be considered.

2.24.4 BHEL may not insist for signing of Contract Agreements in respect of low value and short time period contracts

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi – 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for _____

_____

_____. The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s)/ Contractor(s)

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in

order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/ PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidders(s)/ Contractor(s) from the tender process or take action as per the separate “Guidelines for Suspension of Business Dealings with Suppliers/ Contractors” framed by the Principal.

Section 4 – Compensation for Damages

4.1 If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 – Equal treatment of all Bidders/ Contractors/ Sub-contractors

6.1 The Bidder(s)/ Contractor(s) undertake(s) to demand from his sub-contractors a commitment consistent with this Integrity Pact. This commitment shall be taken only from those sub-contractors whose contract value is more than 20% of Bidder's/ Contractor's contract value with the Principal.

6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.

6.3 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

Section 7 – Criminal Charges against violating Bidders/ Contractors /Sub-contractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 –Independent External Monitor(s)

8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality.

8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or

take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC / PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

9.1 This Pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

9.2 If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 – Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders/ contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

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For & On behalf of the Principal	For & On behalf of the Bidder/ Contractor
(Office Seal)	(Office Seal)

Place----------

Date----------

Witness: _____	Witness: _____
(Name & Address) _____	(Name & Address)_____
_____	_____

PRICED PRICE BID (100MW NTPC RAMAGUNDAM)

PRICE BID FOR Scop of work CUM Technical Specification (BOS1) for 100MW (AC) Floating Solar Photovoltaic Grid- connected Power plant for NTPC at Ramagundam, Telangana

SL.NO	DESCRIPTION OF THE WORK	Unit	QTY	Rate	Total Amount
1	Excavation of isolated earthen/ sand dunes in the reservoir bottom. The location of earthen/sand dunes are marked in the layout and the final level required is also indicated. After excavation this earth is to be disposed at the desired location. (Disposal location shall not exceed 1km).Vendor has to mobilize his team for excavation during the Anchoring and Mooring work done by BHEL.Mobilization of excavation team to be done within 10 days of BHEL intimation for the same.	**cum**	**2,500.00**	**2,113.29**	**5,283,225.00**
2	Installation of floating pontoons and modules as per the instructions and on-site hands-on training by the OEM of pontoons. (1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	**AU**	**40**	**2,767,723.02**	**110,708,920.80**
3	Connection of anchoring ropes/chains to each floating island spreader bars only. as per drawing (1AU=2.5MWAC Block consisting of approx 11180 SPV modules). May note that the Anchoring and Mooring at reservoir	**AU**	**40**	**1,366,930.76**	**54,677,230.20**
4	Interconnection of SPV modules, installation of 14 **Nos** of SCBs , laying/ termination/ ferruling of solar array **1Cx6sqmm** cable including related conduit works. (1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	**AU**	**40**	**117,813.15**	**4,712,526.00**
5	Earthing of 11180 Nos modules and 14 Nos of SCBs using combination of earthing cables of adequate size and earthing strip/flats(1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	**AU**	**40**	**482,728.05**	**19,309,122.00**
6	Installation of earhing electrodes on resevoir bed and interconnection to earthing grid	**AU**	**80**	**306,964.54**	**24,557,163.12**
7	Installation of 2 Nos of ESE type LA on each floating platform. LAs on pond shall be placed as per tentative layout. All necessary work/fabrication required for mounting of LA on floating platform is under bidder scope. Earthing connection of down conductor from LA to earth electrode on reservoir bed. Installation of earthing electrodes on the reservoir bed. (1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	**AU**	**40**	**47,901.26**	**1,916,050.32**
8	I&C of Miscellaneous items such as cable ferrules, cable ties and cable markers (1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	**AU**	**40**	**99,803.69**	**3,992,147.64**
9	Supply of 285 pairs of M/s.Multi contact make MC4 connectors for string connection, 285 pairs of M/s. Multi contact make Y Connectors , cable ties. for 6 sq.mm cable routing from row end to SCB(1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	**set**	**40**	**90,304.44**	**3,612,177.72**
10	Supply of HDPE DWC pipe for routing of 6sqmm cables through pathways where SCBs are mounted	**KM**	**17**	**32,615.13**	**554,457.16**
11	Supply of couplers, joints, bends etc. for 6 sq.mm cable routing from row end to SCB through HDPE DWC pipe (1set= Total number required for cable laying of 2.5MWAC Block consisting of approx 11180 SPV modules)	**Set**	**40**	**54,241.14**	**2,169,645.48**

CONTRACTOR SEAL AND SIGN

PRICED PRICE BID (100MW NTPC RAMAGUNDAM)

PRICE BID FOR Scop of work CUM Technical Specification (BOS1) for 100MW (AC) Floating Solar Photovoltaic Grid- connected Power plant for NTPC at Ramagundam, Telangana

SL.NO	DESCRIPTION OF THE WORK	Unit	QTY	Rate	Total Amount
12	Supply of 2.5sqmm lugs and M4 size screw of SS-304 grade for earth cable connection .	Set	895,400.00	14.085	12,611,709.00
13	Supply of SCB support structure (Aluminium) and SS304 hardware suitable for mounting on HDPE floating pontoons	Nos.	560	1,390.55	778,705.20
14	Supply of 2.5 sq.mm earthing copper cable (Yellow Green PVC sheathed) for connecting 20 modules in a row.(Total nos of rows are 22385)	KM	190	13,560.28	2,576,453.58
15	Supply of ESE type lightning arrester including 5 meter pole/rod, counter, earthling materials, down conductors ,earthing rod below water etc.	set	81	62,574.54	5,068,537.98
16	Supply of 25*3 MM GS/CCS earthing strip for earth grid formation	KM	64	38,743.67	2,479,594.75
17	Supply of SCB earthing cable with necessary lugs and hardware	set	560	2,113.29	1,183,442.40
18	Supply of Water washing system -(Hand held operated pump system with pressure nozzle for cleaning).	Nos.	10	52,145.45	521,454.51
19	Three-**Month** I&C for SPV module wash only(1 AU = 2.5MW Block module wash once per month)	AU	120	7,044.30	845,316.00
20	Supply of life jackets as per IS 6685.	Nos.	40	4,226.58	169,063.20
*21	Supply of boat with safety kits as per specification	No.	1	596,511.59	596,511.59
22	Deputation of Safety Supervisor for duration of I&C (months)	AU	6.00	445,552.18	2,673,313.09
				TOTAL AMOUNT (Excl.GST)	**260,996,766.75**

QUOTE PERCENTAGE (%) ABOVE/BELOW (+/-) (OR) AT PAR TO TOTAL AMOUNT	
QUOTED PERCENTAGE (%) IN WORDS ABOVE/BELOW (OR) AT PAR TO TOTAL AMOUNT	
GST (As applicable)	

NOTE:

1. **CONTRACTOR SHOULD QUOTE PERCENTAGE (%) ABOVE/BELOW (OR) AT PAR TO TOTAL AMOUNT**
2. **QUOTED PERCENTAGE (%) IS APPLICABLE ON ALL ITEM RATES UNIFORMLY.**

***49 No of Supply of ESE type lightning arrester is under L1 scop and 32 nos of Supply of ESE type**

****Supply of boat with safety kits as per specification is under L1 scope only.**

CONTRACTOR SEAL AND SIGN

UNPRICED PRICE BID (100MW NTPC RAMAGUNDAM)

UNPRICE PRICE BID FOR Scop of work CUM Technical Specification (BOS1) for 100MW (AC) Floating Solar Photovoltaic Grid- connected Power plant for NTPC at Ramagundam, Telangana

SL.NO	DESCRIPTION OF THE WORK	Unit of Measurement	QTY	%GST	Rate	Total Amount
1	Excavation of isolated earthen/ sand dunes or sand banks in the reservoir bottom. The location of earthen/sand dunes are marked in the layout and the final level required is also indicated. After excavation this earth is to be disposed at the desired location. (Disposal location shall not exceed 1km).Vendor has to mobilize his team for excavation during the Anchoring and Mooring work done by BHEL.Mobilization of excavation team to be done within 10 days of BHEL intimation for the same.	**Cum**	**2,500.00**		**2,113.29**	**5,283,225.00**
2	Installation of floating pontoons and modules as per the instructions and on-site hands-on training by the OEM of pontoons. (1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	**AU**	**40**		**2,767,723.02**	**110,708,920.80**
3	Connection of anchoring ropes/chains to each floating island spreader bars only. as per drawing (1AU=2.5MWAC Block consisting of approx 11180 SPV modules). May note that the Anchoring and Mooring at reservoir	**AU**	**40**		**1,366,930.76**	**54,677,230.20**
4	Interconnection of SPV modules, installation of 14 **Nos** of SCBs , laying/ termination/ ferruling of solar array **1Cx6sqmm** cable including related conduit works. (1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	**AU**	**40**		**117,813.15**	**4,712,526.00**
5	Earthing of 11180 Nos modules and 14 Nos of SCBs using combination of earthing cables of adequate size and earthing strip/flats(1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	**AU**	**40**		**482,728.05**	**19,309,122.00**
6	Installation of earhing electrodes on resevoir bed and interconnection to earthing grid	**AU**	**80**		**306,964.54**	**24,557,163.12**
7	Installation of 2 Nos of ESE type LA on each floating platform. LAs on pond shall be placed as per tentative layout. All necessary work/fabrication required for mounting of LA on floating platform is under bidder scope. Earthing connection of down conductor from LA to earth electrode on reservoir bed. Installation of earthing electrodes on the reservoir bed. (1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	**AU**	**40**		**47,901.26**	**1,916,050.32**
8	I&C of Miscellaneous items such as cable ferrules, cable ties and cable markers (1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	**AU**	**40**		**99,803.69**	**3,992,147.64**
9	Supply of 285 pairs of M/s.Multi contact make MC4 connectors for string connection, 285 pairs of M/s. Multi contact make Y Connectors , cable ties. for 6 sq.mm cable routing from row end to SCB(1AU=2.5MWAC Block consisting of approx 11180 SPV modules)	**set**	**40**		**90,304.44**	**3,612,177.72**
10	Supply of HDPE DWC pipe for routing of 6sqmm cables through pathways where SCBs are mounted	**KM**	**17**		**32,615.13**	**554,457.16**
11	Supply of couplers, joints, bends etc. for 6 sq.mm cable routing from row end to SCB through HDPE DWC pipe (1set= Total number required for cable laying of 2.5MWAC Block consisting of approx 11180 SPV modules)	**Set**	**40**		**54,241.14**	**2,169,645.48**

12	Supply of 2.5sqmm lugs and M4 size screw of SS-304 grade for earth cable connection .	**Set**	**895,400.00**		**14.085**	**12,611,709.00**
13	Supply of SCB support structure (Aluminium) and SS304 hardware suitable for mounting on HDPE floating pontoons	Nos.	**560**		**1,390.55**	**778,705.20**
14	Supply of 2.5 sq.mm earthing copper cable (Yellow Green PVC sheathed) for connecting 20 modules in a row.(Total nos of rows are 22385)	KM	**190**		**13,560.28**	**2,576,453.58**
*15	Supply of ESE type lightning arrester including 5 meter pole/rod, counter, earthling materials, down conductors ,earthing rod below water etc.	set	**81**		**62,574.54**	**5,068,537.98**
16	Supply of 25*3 MM GS/CCS earthing strip for earth grid formation	**KM**	**64**		**38,743.67**	**2,479,594.75**
17	Supply of SCB earthing cable with necessary lugs and hardware	**set**	**560**		**2,113.29**	**1,183,442.40**
18	Supply of Water washing system -(Hand held operated pump system with pressure nozzle for cleaning).	Nos.	**10**		**52,145.45**	**521,454.51**
19	Three-**Month** I&C for SPV module wash only(1 AU = 2.5MW Block module wash once per month)	AU	**120**		**7,044.30**	**845,316.00**
20	Supply of life jackets as per IS 6685.	Nos.	**40**		**4,226.58**	**169,063.20**
**21	Supply of boat with safety kits as per specification	No.	**1**		**596,511.59**	**596,511.59**
22	Deputation of Safety Supervisor for duration of I&C (months)	AU	**6.00**		**445,552.18**	**2,673,313.09**
			TOTAL AMOUNT (Excl.GST)			**260,996,766.75**
QUOTE PERCENTAGE (%) ABOVE/BELOW (+/-) (OR) AT PAR TO TOTAL AMOUNT						XXXXXX
QUOTED PERCENTAGE (%) IN WORDS ABOVE/BELOW (OR) AT PAR TO TOTAL AMOUNT						XXXXXX
GST (As applicable) To be mandatorily indicated						
NOTE: **1. CONTRACTOR SHOULD QUOTE PERCENTAGE (%) ABOVE/BELOW (OR) AT PAR TO TOTAL AMOUNT** **2. QUOTED PERCENTAGE (%) IS APPLICABLE ON ALL ITEM RATES UNIFORMLY.** ***49 No of Supply of ESE type lightning arrester is under L1 scop and 32 nos of Supply of ESE type lightning ****Supply of boat with safety kits as per specification is under L1 scope only.**						