



Design, Manufacture, Supply, Installation, Testing and Commissioning of 4 sets of 25 kWp Grid Interactive Roof Top Solar Power Plant, one each for Kailash Nagar Barrack, Camp Office-Dep.11C, Time Office-Dep.11 B & Service Centre-Dep.14, at Bailadila Iron Ore Mine (BIOM), Kirandul Complex on Lump Sum Turnkey (LSTK) basis and Comprehensive AMC(CAMC) for 5 years.

3.5 DEDUCTION OF INCOME TAX AND OTHER LEVIES

The payment due on receipt of equipment and materials, and those for the erection and construction portion of the works shall be made after deduction of Income Tax and other levies as applicable.

The GST TDS if any required by employer to be made under GST Act or rules made thereunder shall be deducted at such rate as may be specified with effect from such date as notified, from the invoice of the contractor.

3.6 TERMS OF PAYMENTS

Subject to any deductions that may be made as per the contract and based on submission / maintaining of pertinent Contract Performance Guarantee (s) as per contract terms, the Contractor shall be entitled to receive the contract price in the following manner as per approved billing schedule.

3.6.1 Supplies (for main turnkey contract) - Payment terms - (Ref. Pertinent Price Schedule- Sl. (A) of Price Schedule Format):

3.6.1.1 **80% of the *Supply price (Basic Price)* as per approved billing schedule and 100% Goods and Services Tax (GST) will be paid against following dispatch documents and receipt at site / project stores and certification by Owner:**

- a) Clear lorry receipt / Delivery Challan
- b) Invoice (GST Compliant)
- c) Packing list
- d) Test certificate
- e) Pre-dispatch inspection certificate / waiver of Inspection, by NMDC.
- f) Warranty certificate
- g) Dispatch clearance certificate issued by NMDC.

Contractor agrees that any retention money withheld from any invoice towards security against the obligation due from the contractor i.e., final completion certificate, commissioning certificate etc., and payment for such invoice be regarded as fully discharged for the purpose of GST.

3.6.1.2 **10% of the *Supply price (Basic Price)* will be released after issue of Preliminary Acceptance Certificate. This Payment will be released against submission of following documents:**

- a) Signed commercial Invoice -3 copies
- b) Preliminary Acceptance Certificate (*i.e. PAC*) from Owner /Engineer-In-Charge at project site regarding preliminary acceptance of the system by NMDC.

3.6.1.3 **10% of the *Supply price (Basic Price)* (final payment) will be released after successful commissioning (*i.e. Commissioning cum Final Acceptance*) of the entire system with availability of necessary statutory clearances and issue of Final Acceptance Certificate. This Payment will be released against submission of following documents:**

- a) Signed commercial Invoice -3 copies



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- b) Successful Commissioning certificate (*i.e.* FAC) from Owner /Engineer-In-Charge at project site regarding final acceptance of the system by NMDC and submission of all completed documentation including 'As built drawings' as certified by Owner.

3.6.2 Services- [Design, Engineering, Installation, Testing, Commissioning, Associated Civil works, Liaisoning and obtaining necessary statutory clearances, Training etc. - for main turnkey contract] –Payment Terms- (Ref. Pertinent Price Schedule -Sl. (B) of Price Schedule Format):

- 3.6.2.1 **80 % of the *Services Price (Basic Price)* as per approved billing schedule and 100% Goods and Services Tax (GST) will be paid on pro-rata basis after issuance of Certificate by the Owner/ Engineer-in charge at project site.**

Contractor agrees that any retention money withheld from any invoice towards security against the obligation due from the contractor i.e., final completion certificate, commissioning certificate etc., and payment for such invoice be regarded as fully discharged for the purpose of GST.

- 3.6.2.2 **10 % of the *Services Price (Basic Price)* will be paid after issuance of Preliminary Acceptance Certificate from Owner/ Engineer-in charge at project site, i.e. along with payment due under Clause 3.6.1.2.**

- 3.6.2.3 **10% of the *Services price (Basic Price)* (final payment) will be paid after successful commissioning (*i.e.* Commissioning cum Final Acceptance) of the entire system with availability of necessary statutory clearances and submission of all completed documentation including 'As built drawings' as certified by Owner/ Engineer-in charge at project site, i.e. alongwith payment due under Clause 3.6.1.3.**

Notes:

Regarding payments against Commissioning Certificate / FAC: In case of abnormal delays in issue of Commissioning Certificate / FAC for reasons not attributable to the contractor, the corresponding amount will be released against BG(s) of equivalent value and for a period mutually agreed, as indicated below:

- a) If commissioning of the system cannot be taken up for a period more than **3 months** after issue of 'Preliminary Acceptance Certificate' due to reasons not attributable to the Contractor, then payment against commissioning may be released against a bank guarantee valid up to actual completion date of successful commissioning.

These BGs are additional and over & above any other BGs to be submitted for any other reason.

- b) All fees / charges, to be levied by Statutory / Regulatory Authorities for granting relevant approvals for this work, shall be borne by NMDC or reimbursed by NMDC to Contractor if already paid on behalf of NMDC and upon production of invoice(s) & receipts to Owner/ Engineer-in charge at project site. **These charges would also form part of value for charging GST, if the same is incurred by the Contractor.**



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Contractor shall inform NMDC in writing about such fees / charges of Statutory / Regulatory Authorities, preferably at least two weeks in advance for making necessary arrangements for payments.

The fees / charges to be levied by Statutory / Regulatory Authorities towards relevant approvals, however, do not form part of the contract price and the same will be over and above the the contract price of this work as awarded to the contractor.

No extra charges consequent upon any misunderstanding or otherwise, shall be paid by Owner.

3.6.3 Comprehensive Annual Maintenance Contract for 5 years- [CAMC] –Payment Terms- (Ref. Pertinent Price Schedule -Sl. (C) of Price Schedule Format):

100% of the CAMC Price including Goods and Service Tax (GST) will be payable on pro-rata basis for every quarter against Quarterly running bills, subject to Availability of Performance Guarantee towards comprehensive maintenance contract as per Contract Terms. Payment will be made once in three months, on the service rendered satisfactorily. Record of works carried out during the period should be enclosed along with the Invoice. Following documents are to be submitted for the payment:

- a) Signed commercial invoice – 3 copies
- b) Service certificate from NMDC's engineer-in-charge regarding satisfactory maintenance of the equipment.

3.7.2 Paying Authority:

Head of Finance Dept., Bailadila Iron Ore Mine, Kirandul Complex,

3.7.3 Executing Authority:

Head of Project, Bailadila Iron Ore Mine, Kirandul Complex,

3.8 INSURANCE

- a) The CONTRACTOR at his own cost shall be responsible and take a comprehensive Insurance Policy for "transit-cum-storage-cum-erection" in the joint name of the Head of Project (HOP) / Project Manager/ Unit Head of NMDC, for value to be approved by NMDC covering all risks and liabilities for supply on FOR site basis, storage at site upto erection, testing & commissioning and handing over of the Plant to NMDC. The CONTRACTOR shall also take insurance for Third Party Liability covering loss of human life (engineers and workmen not belonging to CONTRACTOR) and also covering the risks of damage of other's material/ equipment/ properties during execution of the Contract. However, the value of third-party liability for compensation for loss of human life and damage of equipment/property shall be subject to the approval of owner
- b) The CONTRACTOR shall ensure that the insurance coverage is obtained to take care of future cost escalation and variation in taxes & duties during the tenure of the Contract. The



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CONTRACTOR shall, if necessary, also enhance and extend the insurance coverage till completion of the work and handing over of the unit.

- c In order to maintain adequate cover under comprehensive transit-cum- storage-cum-erection insurance, the CONTRACTOR shall fulfill the necessary requirement/obligations of the Insurance Company including provisions of adequate firefighting facilities, watch & ward etc.
- d The CONTRACTOR shall also arrange Accident Insurance Policy for his personnel deputed to site including a separate policy as per Workmen's Compensation Act.

4.0 DESPATCH SCHEDULE

- 4.1 The CONTRACTOR shall prepare and submit in triplicate detailed despatch schedule for the Plant and Equipment to be despatched to the project within one (1) month of the effective date of Contract which shall be approved by the owner. The delivery schedule shall indicate the breakdown of the complete Plant into shipment units with approximate weights and dimensions and the respective dates in the logical sequence of erection upon which such units will be despatched from the CONTRACTOR's and/or its SUB-CONTRACTOR's works within the overall delivery schedule of the Contract. This shall not absolve the CONTRACTOR from his responsibilities for any delay.
- 4.2 All consignments shall be dispatched by road and the CONTRACTOR shall ensure that the following is observed by himself and the SUB-Contractors:
 - i) Identify and obtain the correct type of trucks/trailors, keeping in view the nature of consignments to be dispatched.
 - ii) Take care to avoid all possible chances of damages during transit and to ensure that all packages are firmly secured.
 - iii) The consignee for dispatches shall be clearly marked to the CONTRACTOR at his site address.

5.0 ACCEPTANCE OF THE UNIT

[Details shall be as per Vol-II (Scope of Work and Technical Specifications)]

5.1 Preliminary Acceptance

- 5.1.1 On satisfactory completion of erection & Pre- commissioning of the system, Preliminary acceptance tests shall be taken up within one month by the CONTRACTOR to prove that the System has been supplied as per the Contract and after erection is fit to be started up and commissioned.
- 5.1.2 Tests shall be performed on the individual Sub-assemblies of the unit and also for the system and shall be designed to conduct the systematic check of the components and of the functional operation thereof.
- 5.1.3 Tests shall be conducted by the CONTRACTOR as per contract specifications under his sole responsibility and employing his personnel. Results of tests shall be recorded jointly



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by the CONTRACTOR and the owner. The CONTRACTOR shall handover all the test certificates obtained by them during execution of the work.

- 5.1.4 A detailed programme of tests shall be drawn up by the CONTRACTOR and shall be subject to the approval of the owner. Such programme may be revised and adjusted as may be required by the owner during the test run.
- 5.1.5 On successful completion of Preliminary Acceptance Tests and liquidation of the defects list, Preliminary Acceptance Certificate shall be issued by the owner

Note: - The PAT certificate shall be issued based on certification by acceptance of Engineer-in-Charge.

5.2 Commissioning Cum Final Acceptance

Final acceptance certificate shall be issued by the owner within 30 days from the date of issue of Preliminary Acceptance Test certificate and fulfillment of the following conditions: -

- 5.2.1 On satisfactory completion of Preliminary Acceptance Tests.
- 5.2.2 The CONTRACTOR has rectified in a definitive manner all defects/ objections/ observations mentioned in the Commissioning Certificate;
- 5.2.3 The PV modules are generating the guaranteed output of 95% power.;
- 5.2.4 All other supplies and services have been completed as per the Contract;
- 5.2.5 Final documentation incorporating latest modifications has been submitted by the CONTRACTOR in requisite copies;
- 5.2.6 The CONTRACTOR has met any and all other obligations under this Contract.

- Note(s):-**
1. The FAT certificate shall be issued based on certification by acceptance of engineer-in-charge/ it's representative.
 2. The system will be deemed as commissioned only after issuance of FAT certificate.
 3. However, the CONTRACTOR shall be responsible for pertinent compliances as per the guarantee provisions mentioned in the tender specifications.

6.0 REJECTION OF PLANT AND FACILITIES

In case, even after all possible repairs and replacements the Contractor, fails to attain the minimum level of performance guarantee parameters as per contract stipulations, the owner may reject the plant and facilities and recover the entire cost paid to the Contractor or alternatively the Owner may proceed for commercial settlement with the contractor for acceptance of the facilities at the negotiated price. For further pertinent details, Vol-II (Scope of work & Technical Specifications) of tender document may be referred.



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ANNEXURE - A TO TERMS OF PAYMENT

PROFORMA FOR BILL FOR PAYMENTS

PROJECT : Date of Bill :
Description : Order No.
And date

Name of supplier :
Contract Value : Serial Number of Bill :

To
NMDC Ltd.,

BILL FOR PAYMENT

1. Pursuant to the above referred contract dated the undersigned hereby applies for payment of the sum of Rupees...
..... (Specify amount).
2. The above amount is on account of: Check whichever applicable)

Progressive payment against receipt of equipment at site.
Other (Specify)

Final payment as detailed in the attached schedule (s) which form an integral part of this bill.
3. The payment claimed is as per item (s) No. (s)..... of the payment schedule annexed to the above-mentioned order.
4. This bill consists of this page, details of claim statement (schedule) and the following signed schedules:
 - 1.
 - 2.
 - 3.

The following documents are also enclosed

Signature of Contractor
Authorised Signatory



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ERECTION CONDITIONS OF CONTRACT (ECC)



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ERECTION CONDITIONS OF CONTRACT (ECC)

1.0 GENERAL

- 1.1 The following shall supplement the conditions already contained in the other parts of these documents and shall govern this Contract to be performed at Site.
- 1.2 The Contractor upon signing of the Contract shall, in addition to a Project Coordinator, nominate another responsible officer as his representative at Site suitably designated for the purpose of overall responsibility and coordination of the works to be performed at site. Such person shall function from the site office of the Contractor during the pendency of contract.

2.0 REGULATIONS OF LOCAL AUTHORITIES AND STATUTES

- 2.1 The Contractor shall comply with all the rules and regulations of local authorities during the performance of his field activities. He shall also comply with the Minimum Wages Act, 1948 and the Payment of Wages Act (both of the Government of India) and the rules made there under in respect of any employee or workman employed or engaged by him or his sub-Contractor. Contractor should strictly adhere to all labour laws. The Contractor should follow and implement all labour welfare laws in force. The contractor shall indemnify the Owner in case of any loss or penalty or charges levied on the Owner for the default of Contractor in following or implementing the laws and regulation or orders of Government.
- 2.2 All registration and statutory inspection fees, if any, in respect of his work pursuant to this contract shall be to the account of the Contractor. However, any registration, statutory inspection fees lawfully payable under the provisions of the Indian Boiler Regulations and any other statutory laws and its amendments from time to time during erection in respect of the plant equipment ultimately to be owned by the Owner, shall be to the account of the Owner. Should any such inspection or registration need to be rearranged due to the fault of the Contractor or his sub- Contractor, the additional fees for such inspection and/or registration shall be borne by the Contractor.

3.0 OWNER'S LIEN ON EQUIPMENT

- 3.1 The Owner shall have lien on all equipment brought to the site for the purpose of erection, testing and commissioning of the plant. The Owner shall continue to hold the lien on all such equipment throughout the period of contract. No material brought to the site shall be removed from the site by the Contractor and/or his sub-Contractors without the prior written approval of the Owner/Engineer.

4.0 INSPECTION, TESTING AND INSPECTION CERTIFICATES

- 4.1 The provisions of the clause entitled 'Inspection, Testing and Inspection Certificates' under Section GTC shall also be applicable to the erection portion of the works. The Engineer shall have the right to re-inspect any equipment though previously inspected and approved by the Inspector at the Contractor's works, before and after the same are erected at site. If by the above inspection, the Engineer rejects any equipment, the Contractor shall make good for such rejections either by replacement or modifications/ repairs as may be necessary, to the satisfaction of the Engineer. Such replacements will also include the replacements or re-



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execution of such of those works of their Contractors and/or agencies, which might have got damaged or affected by the replacements or re-work done to the Contractor's work.

5.0 POSSESSION OF SITE

5.1 Suitable possession of the site shall be afforded to the Contractor by the Owner in reasonable time.

5.2 The works so far as it is carried out on the Owner's premises shall be carried out at such time as the Owner may approve.

5.3 In the execution of the works, no persons other than the Contractor or his duly appointed representative, sub-contractor and workmen shall be allowed to do work on the site, except by the special permission, in writing of the Engineer or his representative.

6.0 CONTRACTOR'S SITE OFFICE ESTABLISHMENT

The Contractor shall establish an office at project site and keep posted an authorised representative for the purpose of the contract. Any written order or instruction of the Engineer or his duly authorised representative shall be communicated to the said authorised resident representative of the Contractor and the same shall be deemed to have been communicated to the Contractor at his legal address.

7.0 CO-OPERATION WITH OTHER CONTRACTORS

7.1 The Contractor shall cooperate with all other Contractors or tradesmen of the Owner, who may be performing other works on behalf of the Owner and the workmen who may be employed by the Owner and doing work in the vicinity of the works under the contract. The Contractor shall also so arrange to perform his work as to minimise, to the maximum extent possible, interference with the work of other Contractors and his workmen. Any injury or damage that may be sustained by the employees of the other Contractors and the Owner, due to the Contractor's work shall promptly be made good by the Contractor at his own expense. The Engineer shall determine the resolution of any difference or conflict that may arise between the Contractor and other Contractors or between the Contractor and the workmen of the Owner in regard to their work. If the works of the Contractor is delayed because of any acts or omissions of another Contractor, the Contractor shall have no claim against the Owner on that account of other than an extension of time for completing his works.

7.2 The Engineer shall be notified promptly by the Contractor of any defects in the other Contractor's works that could affect the Contractor's works. The Engineer shall determine the corrective measures if any, required to rectify this situation after inspection of the works and such decisions by the Engineer shall be binding on the Contractor.

8.0 DISCIPLINE OF WORKMEN

The Contractor shall adhere to the disciplinary procedure set by the Engineer in respect of his employees and workmen at site. The Engineer shall be at liberty to object to the presence of



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any representative or employee of the Contractor at the site, if in the opinion of the Engineer such employee has misconduct himself or be incompetent or negligent or otherwise undesirable and then the Contractor shall remove such a person objected to and provide in his place a competent replacement.

9.0 CONTRACTOR'S FIELD OPERATION

9.1 The Contractor shall keep the Engineer informed in advance regarding his field activity plans and schedules for carrying out each part of the works. Any review of such plan or schedule or method of work by the Engineer shall not relieve the Contractor of any of his responsibilities towards the field activities. Such reviews shall also not be considered as an assumption of any risk or liability by the Engineer or the Owner or any of his representatives and no claim of the Contractor will be entertained because of the failure or inefficiency of any such plan or schedule or method of work reviewed. The Contractor shall be solely responsible for the safety, adequacy and efficiency of plant and equipment and his erection methods.

9.2 The Contractor shall have the complete responsibility for the conditions of the work site including the safety of all persons employed by him or his sub-Contractor and all the properties under his custody during the performance of the work.

This requirement shall apply continuously till the completion of the contract and shall not be limited to normal working hours. The construction review of the Engineer is not intended to include review of Contractor's safety measures in, on or near the work-site and their adequacy or otherwise.

10.0 PHOTOGRAPHS AND PROGRESS REPORT

10.1 The contractor shall furnish five (5) prints each to the engineer of progress photographs of the work done at site. Photographs shall be taken as and when indicated by the engineer or his representative. Photographs shall be adequate in size and number to indicate various stages of erection. Each photograph shall contain the date, the name of the contractor and the title of the photograph.

10.2 The above photographs shall accompany the monthly progress report detailing out the progress achieved on all erection activities as compared to the schedules. The report shall also indicate the reasons for the variance between the scheduled and actual progress and the action proposed for corrective measures wherever necessary.

11.0 MAN-POWER REPORT

11.1 The Contractor shall submit to the Engineer, on the first day of every month, a man hour schedule for the month, detailing the man hours scheduled for the month, skill wise and area wise.

11.2 The Contractor shall also submit to the Engineer on the first day of every month, a manpower report of the previous month detailing the number of persons scheduled to have been employed and actually employed, skill wise and the areas of employment of such labour.

12.0 PROTECTION WORK



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The Contractor shall have total responsibility for protecting his works till it is finally taken over by the Owner. No claim will be entertained by the Owner or the Engineer for any damage or loss to the contractor's works and the Contractor shall be responsible for the complete restoration of the damaged works to its original condition to comply with the specifications and drawings. Should any such damage to the Contractor's Works occur because of other party not under his supervision or control, the Contractor shall make his claim directly with the party concerned. If disagreement or conflict or dispute develops between the Contractor and the other party or parties concerned regarding the responsibility for damage to the Contractor's Works, the same shall be resolved as per the provisions of the Clause-7.0 above titled Co-operation with Other Contractors. The Contractor shall not cause any delay in the repair of such damaged Works because of any delay in the resolution of such disputes. The Contractor shall proceed to repair the Work immediately and no cause thereof will be assigned pending resolution of such disputes.

13.0 EMPLOYMENT OF LABOUR

- 13.1 The Contractor will be expected to employ on the work only his regular skilled employees with experience in the particular work. No female labour shall be employed after darkness. No person below the age of eighteen (18) years shall be employed.
- 13.2 All travelling expenses including provisions of all necessary transport to and from Site, lodging allowances other payments to the Contractor's employees shall be the sole responsibility of the Contractor.
- 13.3 The hours of work on the Site shall be decided by the Engineer and the Contractor shall adhere to it. Working hours will normally be eight (8) hours per day - Thursday through Tuesday.
- 13.4 Contractor's employees shall wear identification badges while at Site.
- 13.5 In case the Owner becomes liable to pay any wages or dues to the labour or to any Government agency under any of the provisions of the Minimum Wages Act, Workmen Compensation Act, Contract Labour Regulation Abolition Act or any other law or due to any act of omission or commission by the Contractor, the Owner may make such payments and shall recover the same from the Contractor's bills.

14.0 FACILITIES TO BE PROVIDED BY THE OWNER

14.1 Space:

NMDC will provide suitable Storage Space at a convenient location on free of charge basis at Site during construction period. The watch & ward of the stored items will be the responsibility of the Contractor.

The Contractor shall intimate the Owner within thirty (30) days from the date of the Letter of Award, about his exact requirement of space for his office, storage area, pre-assembly and fabrication areas, labour colony area, etc. The above requirement shall be reviewed by the Engineer and space will be allotted to the Contractor for construction of his temporary structures like office, storage sheds, labour and staff colony etc. All these areas shall be completely vacated by the Contractor on completion of Contract or earlier if required by the Owner.



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14.2 Electricity

NMDC will provide 440 V/ 230 V Electricity at one point/ place near the site for fabrication/ lighting purpose on free of charge basis during construction period for which the contractor shall submit his electrical power requirements to the Engineer in-charge.

Contractor shall submit to the Engineer within thirty (30) days from the date of the Award Letter, his electrical power requirements, if any, to allow the planning of the temporary electrical distribution by the Engineer. The Contractor shall be provided with electricity for the purposes of the Contract, only at one point in the project Site. The Contractor shall make his own further distribution arrangement.

All temporary wiring must comply with local regulations and will be subject to Engineer's inspection and approval before connection to supply.

14.3 Water

NMDC will provide water for construction purpose (if any) during construction stage, subject to availability on free of charge basis.

Supply of water will be made available for the construction purposes at an agreed single point in the Site. Any further distribution will be the responsibility of the Contractor. Free drinking water will also be provided at one agreed point in the Site. Further distribution either to his labour colony or his work site or to his office shall be the responsibility of the Contractor.

14.4 Accommodation for contractor's staff during CAMC period

Guesthouse/ Hostel Accommodation or Suitable quarters will be provided on request to the contractor's Engineer/ personnel on chargeable basis, if available.

15.0 FACILITIES TO BE PROVIDED BY THE CONTRACTOR

15.1 Tools, Tackles and Scaffoldings

The Contractor shall provide all the erection equipment, tools, tackles and scaffoldings required for pre-assembly, erection, testing and commissioning of the equipment covered under the Contract. He shall submit a list of all such materials to the Engineer before the commencement of pre-assembly at Site. These equipment etc. shall not be removed from the Site without the written permission of the Engineer.

15.2 Communication

The Owner may extend the telephone & telex facilities, if available at Site, for purposes of Contract. The Contractor shall be charged at actuals for such facilities.



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15.3 **First Aid**

- 15.3.1 The Contractor shall provide necessary first-aid facilities for all his employees, representatives and workmen working at the Site. Enough number of Contractor's personnel shall be trained in administering first aid.
- 15.3.2 The Owner may provide the Contractor, in case of an emergency, the services of an ambulance for transportation to the nearest hospital.

15.4 **Cleanliness**

- 15.4.1 The Contractor shall be responsible for keeping the entire site allotted to him clean and free from rubbish, debris etc. during the period of Contract. The Contractor shall employ enough number of special personnel to thoroughly clean his work-area at least once in a day. All such rubbish and scrap material shall be stacked or disposed in a place to be identified by the Engineer. Materials and stores shall be so arranged to permit easy cleaning of the storage areas. In areas where equipment might drip oil and cause damage to the floor surface, a suitable protective cover of a flame resistant, oil proof sheet shall be provided to protect the floor from such damage.
- 15.4.2 Similarly the labour colony and the office of the Contractor shall be kept clean and neat to the entire satisfaction of the Engineer. Proper sanitary arrangements shall be provided by the Contractor, in the work areas, office and labour colony of the Contractor.

16.0 **LINES AND GRADES**

All the Works shall be performed to the lines, grades and elevations indicated on the drawings. The Contractor shall be responsible to locate and lay-out the Works. Basic horizontal and vertical control points will be established and marked by the Engineer at Site at suitable points. These points shall be used as datum for the Works under the Contract. The Contractor shall inform the Engineer well in advance of the times and places at which he wishes to do work in the area allotted to him, so that suitable datum points may be established and checked by the Engineer to enable the Contractor to proceed with his works. Any work done without being properly located may be removed and/or dismantled by the Engineer at Contractor's expense.

17.0 **FIRE PROTECTION**

- 17.1 The work procedures that are to be used during the erection shall be those which minimise fire hazards to the extent practicable. Combustible materials, combustible waste and rubbish shall be collected and removed from the Site at least once each day. Fuels, oils and volatile or flammable materials shall be stored away from the construction and equipment and materials storage areas in safe containers. Untreated canvas paper, plastic or other flammable flexible materials shall not at all be used at site for any other purpose unless otherwise specified. If any such materials are received with the equipment at the Site, the same shall be removed and replaced by the Contractor with acceptable materials before moving into the erection areas or storage.



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- 17.2 Similarly corrugated paper, fabricated cartons etc. will not be permitted in the erection area either for storage or for handling of materials. All such materials used shall be of water proof and flame-resistant type. All the other materials such as working drawings, plans, etc. which are combustible but are essential for the Works to be executed shall be protected against combustion resulting from Welding sparks, cutting flames and other similar fire sources.
- 17.3 All the Contractor's supervisory personnel and sufficient number of workers shall be trained for fire-fighting and shall be assigned specific fire protection duties. Enough of such trained personnel must be available at the Site during the entire period of the Contract.
- 17.4 The Contractor shall provide enough fire protection equipment of the required types and numbers for the storage, office, temporary structures, labour colony area etc. Access to such fire protection equipment, shall be easy and kept open at all times.

18.0 SECURITY

The Contractor shall have total responsibility for all equipment and materials in his custody stored, loose, semi- assembled and/or erected by him at Site. The Contractor shall make suitable security arrangements including employment of security personnel to ensure the protection of all materials, equipment and Works from theft, fire, pilferage and any other damages and loss. All materials of the Contractor shall enter and leave the project site only with the written permission of the Engineer in the prescribed manner.

19.0 CONTRACTOR'S AREA LIMITS

The Contractor shall work within the areas allotted to him and shall not trespass into areas used by other Contractors and agencies. The Contractor shall be responsible to ensure that none of his personnel trespass in others' areas. In case of such a need for the Contractor's personnel to work out of the areas allotted to him, the same shall be done only with the written permission of the Engineer.

20.0 CONTRACTOR'S COOPERATION WITH THE OWNER

In cases where the performance of the erection work by the Contractor affects the operation of the system facilities of the Owner, such erection work of the Contractor shall be scheduled to be performed only in the manner stipulated by the Engineer and the same shall be acceptable at all times to the Contractor. The Engineer may impose such restrictions on the facilities provided to the Contractor such as electricity, water etc. as he may think fit in the interest of the Owner and the Contractor shall strictly adhere to such restrictions and cooperate with the Engineer. It will be the responsibility of the Contractor to provide all necessary temporary instrumentation and other measuring devices required during start-up and operation of the equipment systems which are erected by him. The Contractor shall also be responsible for flushing and initial filling of all the oil and lubricants required for the equipment supplied and erected by him, so as to make such equipment ready for operation. The Contractor shall be responsible for supplying such flushing oil and other lubricants.

21.0 PRE-COMMISSIONING TRIALS AND INITIAL OPERATIONS

The pre-commissioning trials and initial operations of the equipment supplied and erected by the Contractor shall be the responsibility of the Contractor as detailed in relevant clauses in



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Section GTC. The Contractor shall provide, in addition, test instruments, calibrating devices etc. and the labour required for the successful performance of these trials. If it is anticipated that the above test may prolong for a long time, the Contractor's workmen required for the above test shall always be present at site during such trials.

22.0 MATERIAL HANDLING AND STORAGE

- 22.1 All the equipment supplied under the contract and arriving at site shall be promptly received, unloaded and transported and stored in the storage spaces by the Contractor.
- 22.2 Contractor shall be responsible for examining all the shipment and notify the Engineer immediately of any damage, shortage, discrepancy etc. for the purpose of Engineer's information only. The Contractor shall submit to the Engineer every week a report detailing all the receipts during the week. However, the Contractor shall be solely responsible for any shortages or damage in handling and/or in storage and erection of the equipment at the site. Any demurrage, wharfage and other such charges claimed by the transporters, railways etc. shall be to the account of the Contractor.
- 22.3 The Contractor shall maintain an accurate and exhaustive record detailing out the list of all equipment received by him for the purpose of erection and keep such record open for the inspection of the Engineer at any time.
- 22.4 All equipment shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings, etc. shall be used for unloading and/or handling of the equipment without the specific written permission of the Engineer. The equipment stored shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the store shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.
- 22.5 All electrical panels, control gears, motors and such other devices shall be properly dried by heating before they are installed and energised. Motor bearings, slip rings, commutators and other exposed parts shall be protected against moisture ingress and corrosion during storage and periodically inspected. Heavy rotating parts in assembled conditions shall be periodically rotated to prevent corrosion due to prolonged storage.
- 22.6 All the electrical equipment such as motors, generators, etc. shall be tested for insulation resistance at least once in three months from the date of receipt till the date of commissioning and a record of such measured insulation values shall be maintained by the Contractor. Such records shall be open for inspection by the Engineer.
- 22.7 The Contractor shall ensure that all the packing materials and protection devices used for various equipment during transit and storage are removed before the equipment are installed.
- 22.8 The consumables and other supplies likely to deteriorate due to storage shall be thoroughly protected and stored in a suitable manner to prevent damage or deterioration in quality by storage.



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- 22.9 All the materials stored in the open or dusty location must be covered with suitable weather proof and flameproof covering materials wherever applicable.
- 22.10 If the materials belonging to the Contractor are stored in areas other than those earmarked for him, the Engineer will have the right to get these moved to the area earmarked for the Contractor at the Contractor's risk and cost.
- 22.11 The Contractor shall be responsible for making suitable indoor storage facilities to store all equipment which require indoor storage. Normally, all the electrical equipment such as motors, control gear, generators, exciters and consumables like electrodes, lubricants etc. shall be stored in the closed storage space. The Engineer, in addition, may direct the Contractor to move certain other materials which in his opinion will require indoor storage, to indoor storage areas which the Contractor shall strictly comply with.

23.0 **CONSTRUCTION MANAGEMENT**

- 23.1 The field activities of the Contractor will be coordinated by the Engineer and the Engineer's decision shall be final in resolving any disputes or conflicts between the Contractor and the other Contractors of the Owner regarding scheduling and co-ordination of work. Such decision by the Engineer shall not be a cause for extra compensation or extension of time for the Contractor.
- 23.2 The Engineer shall hold weekly meetings of all the Contractors working at Site, at a time and a place to be designated by the Engineer. The Contractor shall attend such meetings and take notes of discussions during the meeting and the decisions of the Engineer and shall strictly adhere to those decisions in performing his Works. In addition to the above weekly meetings, the Engineer may call for other meetings either with individual Contractors or in such a case the Contractor, if called, will also attend such meetings.
- 23.3 Time is the important factor of the Contract and the Contractor shall be responsible for performance of the Works in accordance with the specified construction schedule. If at any time, the Contractor is falling behind the schedule, he shall take necessary action to make good for such delays by increasing his work force or by working overtime or otherwise accelerate the progress of the work to comply with the schedule and shall communicate such actions in writing to the Engineer, satisfying the Engineer that Contractor's action will compensate for the delay. The Contractor shall not be allowed any extra compensation for such action.

24.0 **FIELD OFFICE RECORDS**

The Contractor shall maintain at his Site Office up-to-date copies of all drawings, specifications and other Contract Documents and any other supplementary data complete with all latest revisions thereto. The Contractor shall also maintain in addition the continuous record of all changes to the above Contract Documents, drawings, specifications, supplementary data etc. effected at the field and on completion of his total assignment under the Contract shall incorporate all such changes on the drawings and other Engineering data to indicate as installed condition of the equipment supplied and erected under the Contract. Such drawings and Engineering data shall be submitted to the Engineer in required number of copies.

25.0 **CONTRACTOR'S MATERIALS BROUGHT ON TO SITE**



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- 25.1 The Contractor shall bring to Site all equipment, components, parts, materials, including erection equipment, tools and tackles for the purpose of the Works under intimation to the Engineer. All such goods shall, from the time of their being brought to site vest in the Owner, but may be used for the purpose of the Works only and shall not on any account be removed or taken away by the Contractor without the written permission of the Engineer. The Contractor shall nevertheless be solely liable and responsible for any loss or destruction thereof and damage thereto.
- 25.2 The Owner shall have a lien on such goods for any sum or sums which may at any time be due or owing to him by the Contractor, under, in respect of or by reasons of the Contract. After giving a fifteen (15) days' notice in writing of his intention to do so, the Owner shall be at liberty to seal and dispose of any such goods, in such manner as he shall think fit including public auction or private treaty and to apply the proceeds in or towards the satisfaction of such sum or sums due as aforesaid.
- 25.3 After the completion of the Works, the Contractor shall remove from the Site under the direction of the Engineer the materials such as erection equipment, erection tools and tackles, scaffolding etc. with the written permission of the Engineer. If the Contractor fails to remove such materials, within fifteen (15) days of issue of a notice by the Engineer to do so then the Engineer shall have the liberty to dispose of such materials as detailed under Clause-25.2 above and credit the proceeds thereto to the account of the Contractor.

26.0 **PROTECTION OF PROPERTY AND CONTRACTOR'S LIABILITY**

- 26.1 The Contractor shall be responsible for any damage resulting from his operations. He shall also be responsible for protection of all persons including members of public and employees of the Owner and the employees of other Contractors and sub-Contractors and all public and private property including structures, building, other plants and equipment and utilities either above or below the ground.
- 26.2 The Contractor will ensure provisions of necessary safety equipment such as barriers, sign-boards, warning lights and alarms, etc. to provide adequate protection to persons and property. The Contractor shall be responsible to give reasonable notice to the Engineer and the Owners of public or private property and utilities when such property and utilities are likely to get damaged or injured during the performance of his Works and shall make all necessary arrangements with such Owners, related to removal and/or replacement or protection of such property and utilities.

27.0 **INSURANCE**

- 27.1 In addition to the conditions covered under the Clause titled Insurance in Section GCC, the following provisions will also apply to the portion of the Works to be done beyond the Contractor's own or his Sub-Contractor's manufacturing works.
- 27.2 **Workmen's Compensation Insurance**

This insurance shall protect the Contractor against all claims applicable under the Workmen's Compensation Act, 1948 (Government of India). This policy shall also cover the Contractor



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against claims for injury, disability, disease or death of his or his Sub-Contractor's employees, which for any reason are not covered under the Workmen's Compensation Act, 1948. The liability shall not be less than:

Workmen's Compensation. As per statutory provisions

Employee's liability. As per statutory provisions

27.3 Comprehensive Automobile Insurance

This insurance shall be in such a form to protect the Contractor against all claims for injuries, disability, disease and death to members of public including the Owner's men and damage to the property arising from the use of motor vehicles during on or off the Site operations, irrespective of the ownership of such vehicles.

27.4 Comprehensive General Liability Insurance

27.4.1 This insurance shall protect the Contractor against all claims arising from injuries, disabilities, disease or death of members of public or damage to property of others, due to any act or omission on the part of the Contractor, his agents, his employees, his representatives and sub-Contractors or from riots, strikes and civil commotion. This insurance shall also cover all the liabilities of the Contractor arising out of the Clause titled "Defence of Suits" under Section GCC.

27.4.2 The hazards to be covered will pertain to all the Works which and areas where the Contractor, his sub-Contractors, his agents and his employees have to perform pursuant to the Contract.

27.5 The above are only illustrative list of insurance covers normally required and it will be the responsibility of the Contractor to maintain all necessary insurance coverage to the extent both in time and amount to take care of all his liabilities either direct or indirect, in pursuance of the Contract.

28.0 UNFAVOURABLE WORKING CONDITIONS

The Contractor shall confine all his field operations to those works which can be performed without subjecting the equipment and materials to adverse effects, during inclement weather conditions, like monsoons, storms etc. and during other unfavourable construction conditions. No field activities shall be performed by the Contractor under conditions which might adversely affect the quality and efficiency thereof, unless special precautions or measures are taken by the Contractor in a proper and satisfactory manner in the performance of such Works and with the concurrence of the Engineer. Such unfavourable construction conditions will in no way relieve the Contractor of his responsibility to perform the Works as per the schedule.

29.0 PROTECTION OF REFERENCE POINTS



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The Contractor shall ensure that the bench marks, reference points, etc. which are marked out either with the help of the Engineer or by the Engineer shall not be disturbed in any way during the performance of his Works. If any work is to be performed which disturb such references, the same shall be done only after these are transferred to other suitable locations under the direction of the Engineer. The Contractor shall provide all necessary materials and assistance for such relocation of reference points etc.

30.0 WORK AND SAFETY REGULATIONS

30.1 The Contractor shall ensure proper safety of all the workmen, materials, plant and equipments belonging to him or to the Owner or to others, working at or near the site. The Contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislations and by the Engineer as the Engineer may deem necessary.

30.2 The Contractor will notify well in advance to the Engineer of Contractor's intention to bring to the Site any Container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals which may involve hazards. The Engineer shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the Works and the Contractor shall strictly adhere to and comply with such instructions. The Engineer shall have the right at his sole discretion to inspect any such container or such construction plant/equipment for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by the Owner. The Owner will not entertain any claim of the Contractor towards additional safety provisions/ conditions to be provided for/constructed as per Engineer's instructions.

Further any such decision of Engineer shall not, in any way, absolve the Contractor of his responsibilities, and in case, use of such container or entry thereof into the site is forbidden by the Engineer, the Contractor shall use alternative methods with the approval of the Engineer without any extension of work schedule.

30.3 Where it is necessary to provide and/or store petroleum products or petroleum mixtures and explosives, the Contractor shall be responsible for carrying out such provision and for storage in accordance with the rules and regulations laid down in Petroleum Act 1934, Explosives Act 1948 and Petroleum and Carbide of Calcium Manual Published by the Chief Inspector of Explosives of India. In case, any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the Contractor shall be responsible for obtaining the same.

30.4 All equipment used in construction and erection by Contractor shall meet Indian/International Standards and where such standards do not exist, the Contractor shall ensure these to be absolutely safe. All equipment shall be strictly operated and maintained by the Contractor in accordance with manufacturer's operation manual and safety instructions and as per Guidelines/Rules of the Owner in this regard.

30.5 Periodical Examinations and all tests for all lifting/ hoisting equipments and tackles shall be carried out in accordance with the relevant provisions of Factories Act 1948, Indian Electricity Act 1910 and associated Laws/Rules in force from time to time. A register of such



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examinations and tests shall be properly maintained by the Contractor and will be promptly produced as and when desired by the Engineer or by the person authorised by the Engineer.

- 30.6 The Contractor shall be fully responsible for the safe storage of his and his Sub-contractors' radio-active sources in accordance with BARC/DAE Rules and other applicable provisions. All precautionary measures stipulated by BARC/DAE in connection with use, storage and handling of such materials will be taken by the Contractor.
- 30.7 The Contractor shall provide suitable safety equipment/gears of prescribed standard to all employees and workmen according to the need, as may be directed by the Engineer who will also have right to examine these safety equipment/gears to determine their suitability, reliability, acceptability and adaptability.
- 30.8 Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experienced, qualified and competent person strictly in accordance with the Codes/Practices/ Rules framed under Indian Explosives Act pertaining to handling, storage and use of the explosives.
- 30.9 The Contractor shall provide safe working conditions to all workmen and employees at the Site including safe means of access, railings, stairs, ladders, scaffolding etc. The scaffolding shall be erected under the control and supervision of an experienced and competent person. For erection, good and standard quality of material only shall be used by the Contractor.
- 30.10 The Contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the Owner or other Contractors under any circumstances, whatsoever, unless expressly permitted in writing by the Engineer to handle such fuses, wiring or electrical equipment.
- 30.11 Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractors or Owner, he shall:
- 30.11.1 Satisfy the Engineer that the appliance is in good working condition;
- 30.11.2 Inform the Engineer of the maximum current rating, voltage and phases of the appliances;
- 30.11.3 Obtain permission of the Engineer detailing the sockets to which the appliances may be connected.
- 30.12 The Engineer will not grant permission to connect until he is satisfied that:
- 30.12.1 The appliance is in good condition and is fitted with a suitable plug.
- 30.12.2 The appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.
- 30.13 No electric cable in use by the Contractor/Owner will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladle or similar equipment will rest against or attached to it.
- 30.14 No repair work shall be carried out on any live equipment. The equipment must be declared safe by the Engineer and a permit to work shall be issued by the Engineer before any repair



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work is carried out by the Contractor. While working on electric lines/equipment whether alive or dead, suitable type and sufficient quantity of tools will have to be provided by the Contractor to his electricians/workmen/ officers.

- 30.15 The Contractor shall employ necessary number of qualified full time Electricians/Electrical Supervisors to maintain his temporary electrical installations.
- 30.16 The Contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent or on contract, shall employ at least one full time officer exclusively as safety officer to supervise safety aspects of the equipment and workmen who will co-ordinate with the Project Safety Officer, in case of work being carried out through sub-Contractor, the sub-Contractor's employees/ workmen, for above purpose. The name and address of such Safety Officer of the Contractor will be promptly informed in writing to the Engineer with a copy to Project Safety officer before he starts work or immediately after any change of the incumbent is made during the currency of the Contract.
- 30.17 In case any accident occurs during the construction/ erection or other associated activities undertaken by the Contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform the same to the Engineer in prescribed form and also to all the authorities envisaged under the applicable laws.
- 30.18 The Engineer shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury/ accident and he shall comply to remove short comings promptly. The Contractor after stopping the specific work, can, if felt necessary, appeal against the order of stoppage of work to the General Manager of the Project within 3 days of such stoppage of work and decision of the Owner in this respect shall be conclusive and binding on the Contractor.
- 30.19 The Contractor shall not be entitled for any damage/ compensation for stoppage of work due to safety reasons as provided in para 28.18 above and the period of such stoppage of work will not be taken as an extension of time for completion of work and will not be the ground for waiver of levy of liquidated damages.
- 30.20 The Contractor shall follow and comply with all NMDC Safety Rules and relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without any demur, protest or contest or reservation. In case of any inconformity between statutory requirement and NMDC Safety Rules referred above, the latter shall be binding on the Contractor unless the statutory provisions are more stringent.
- 30.21 If the Contractor fails in providing safe working environment as per NMDC Safety Rules or continues the work even after being instructed to stop work by the Engineer as provided in para 30.18 above, the Contractor shall promptly pay to NMDC on demand compensation at the rate of Rs.5,000/- per day or part thereof till the instructions are complied with and so certified by the Engineer. However, in case of accident taking place causing injury to any



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individual, the provisions contained in para 30.22 shall also apply in addition to compensation mentioned in this para.

Such compensation is liable to GST and the applicable GST shall be recovered from the contractor.

- 30.22 If the Contractor does not take all safety precautions and/or fails to comply with the Safety Rules as prescribed by NMDC or under the applicable laws for the safety of the plant & equipment and for the safety of personnel and the Contractor does not prevent hazardous conditions which may cause injury to his own employees or employees of other Contractors, or to NMDC employees or any other person who are at site or adjacent thereto, the Contractor shall be responsible for payment of compensation to NMDC as per the following schedule:

a.	Fatal injury or causing death	Rs.1,00,000.00 per person	Accident, these are applicable for death.
b.	Major injuries or accident causing 25% or more permanent disablement to workmen or employees	Rs.20,000/- per person	Injury to any person whatsoever

Permanent disablement shall have same meaning as indicated in Workmen's Compensation Act. The compensation mentioned above shall be in addition to the compensation payable to the workmen/ employees under the relevant provisions of the Workmen's Compensation Act and Rules framed there under or any other applicable laws as applicable from time to time. In case the Owner is made to pay such Compensation then the Contractor is liable to reimburse the Owner such amount in addition to the compensation indicated above.

- 30.23 If the Contractor observes all the Safety Rules and Codes, Statutory Laws and Rules during the currency of Contract and no accident occurs then NMDC may consider the performance of the Contractor and award suitable "ACCIDENT FREE SAFETY MERITORIOUS AWARD" as per scheme as may be announced separately from time to time.

31.0 CODE REQUIREMENTS

The erection requirements and procedures to be followed during the installation of the equipment shall be in accordance with the relevant Indian Boiler Regulations. ASME codes and accepted good engineering practice, the Engineer's Drawings and other applicable Indian recognised codes and the laws and regulations of the Government of India.

32.0 FOUNDATION CHECKING, DRESSING & GROUTING

- 32.1 The foundation levels including the locations and levels of equipment foundation bolts and pockets and other embedment shall be checked by the Contractor and he shall satisfy himself about the correctness of foundations etc. in advance of commencement of actual erection work. In case any discrepancy is noted, he shall immediately report the same to the Engineer



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in writing. Any delay arising out of non-compliance by the Contractor of the above requirements shall be to the Contractor's account.

32.2 The concrete foundation surfaces shall be prepared by the Contractor by chipping and dressing as required to bring such foundations to the required levels and to provide the necessary roughness for bondage and to assure enough bearing strength. All latent and surface film shall be removed and cleaned.

32.3 Unless otherwise specified, all the equipment bases and foundation bolt holes shall be grouted by the Contractor with non-shrink grout in accordance with the method specified by the manufacturer of non-shrink grouting material. Non-shrink grouting material shall be as approved by the Engineer. All grouting materials shall be supplied by the Contractor.

32.4 **Placing of Grout**

32.4.1 After the base has been prepared, its alignment and level has been checked and before actually placing the grout a low dam shall be set around the base at a distance that will permit pouring and manipulation of the grout. The height of such dam shall be at least 25 mm above the bottom of the base. Suitable size and number of chains shall be introduced under the base before placing the grout, so that such chains can be moved back and forth to push the grout into every part of the space under the base.

32.4.2 The grout shall be poured either through grout holes if provided or shall be poured at one side or at two adjacent sides giving it a pressure head to make the grout move in a solid mass under the base and out in the opposite side. Pouring shall be continued until the entire space below the base including foundation bolt holes are thoroughly filled and the grout stands at least 25 mm higher all around than the bottom of the base plate. Enough care shall be taken to avoid any air or water pockets beneath the bases.

32.5 **Finishing the Edges of the Grout**

The poured grout shall be allowed to stand undisturbed until it is well set. Immediately thereafter, the dam shall be removed and grout which extends beyond the edges of the equipment base plates shall be cut off flush and removed. The edges of the grout shall then be pointed and finished with 1:2 cement mortar pressed firmly to bond with body of the grout and smoothed with a tool to present a smooth vertical surface. The work shall be done in a clean and workmanlike manner and the adjacent floor spaces, exposed edges of the foundations and equipment base plates shall be thoroughly cleaned of any spillage of the grout.

32.6 After the grout is set, it shall be kept moist with wet sacks for at least 7 days.

32.7 **Checking of Equipment after Grouting**

After the grout is set and cured, the Contractor shall check and verify the alignment of equipment, alignment of shafts of rotating machinery, the slopes of all bearing pedestals, centring of rotors with respect to their sealing bores, couplings, etc. as applicable and the like items to ensure that no displacement had taken place during grouting. The values recorded prior to grouting shall be used during such post grouting check-up and verifications. Such pre



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and post grout records of alignment details shall be maintained by the Contractor in a manner acceptable to the Engineer.

33.0 SHAFT ALIGNMENTS

All the shafts of rotating equipment shall be properly aligned to those of the matching equipment. The equipment shall be free from vibration so as to avoid over-heating of bearings. All bearings, shafts and other rotating parts shall be thoroughly cleaned and suitably lubricated before starting.

34.0 DOWELLING

All the motors and other equipment shall be suitably dowelled after alignment of shafts with tapered machined dowels.

35.0 CHECK OUT OF CONTROL SYSTEMS

After completion of wiring, cabling furnished under separate specifications and laid and terminated by the Owner, the Contractor shall check out the operation of all control systems for the equipment supplied and erected under the Contract.



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***[Annexure-13 to ITT]**

**(Format for Dummy Price Set- Attached as separate file for
Vol-I of Tender Document)**