Government of India

Indira Gandhi Centre for Atomic Research

Materials Chemistry & Metal Fuel cycle Group

Metal Fuel Recycle Group

Pyro Process Engineering Division

Tender No: IGC/MC&MFCG/PPED/PPEMS/ELE/AKSK/04/2025

Tender document

for

Contract for Periodic preventive maintenance of Electrical power distribution, Motor control centre (MCC) & blower motors, Furnace equipments with control panel and various electrical works in the PPRDF at MC&MFCG, IGCAR, Kalpakkam.

INDEX

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NOTICE INVITING e-TENDER

Tender Notice No.: IGC/MC&MFCG/PPED/PPEMS/ELE/AKSK/04/2025

I. Guidelines for e-Tendering in CPPP website:

1. To participate in the tendering process on the CPP Portal, Prospective Bidders require a valid Class III Digital Signature Certificates. All the documents related to the eligibility criteria of tender should be submitted electronically through CPP portal only. The instructions given in Annexure-1 are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal. More information useful for submitting online bids on the CPP Portal may be obtained at :https://eprocure.gov.in/eprocure/app.

II. NIT Details:

2. Online item rate tender in Two parts i.e. Part-I – Techno-commercial Bid and Part-II – Financial Bid are hereby invited through e-Tendering mode on behalf of the President of India by **Superintending Engineer, MC&MFCG, IGCAR, Kalpakkam - 603 102**,Chengalpattu District for the following work from experienced Contractors who have satisfactorily completed similar works of such magnitude and have valid "ESB License" issued by the Tamilnadu or other state Electrical Licensing Board.

i)	NIT No.	**IGC/MC&MFCG/PPED/PPEMS/ELE/AKSK/04/2025**
ii)	Name of work	Contract for Periodic preventive maintenance of Electrical power distribution, Motor control centre (MCC) & blower motors, Furnace equipments with control panel and various electrical works in the PPRDF at MC&MFCG, IGCAR, Kalpakkam.
iii)	Estimated Cost put to tender	**Rs. 25.00 Lakhs (Inclusive of GST 18%)**
iv)	Time Allowed	**24 [Twenty Four] Months**
v)	Earnest Money Deposit (EMD)	**Rs.50,000/- (Rs. Fifty thousand only)** in the form of Deposit at Call receipt or Demand Draft / Bankers Cheque/ FDR drawn in favour of PAY AND ACCOUNTS OFFICER, IGCAR, Kalpakkam payable at Kalpakkam. **Cash, Cheque, bank guarantee for Earnest Money deposit will not be accepted.**
vi)	Cost of Tender Document	**Nil**
vii)	Tender processing fee	**Nil**
viii)	Security Deposit	**2.5% of tendered value**

ix)	Performance Guarantee	**3% of tendered value**
x)	Publishing date of tender	From 25.11.2025 (10:00 Hours)
xi)	*Documents download/Sale Start date and Time*	26.11.2025 (10:00 Hours) To Download – please visit CPPP website on: https://eprocure.gov.in/eprocure/app Detailed NIT is also available on website www.igcar.gov.in for view only.
xii)	*Seek Clarification Start Date and Time*	From 27.11.2025 (10:00 Hours) The bidders are requested to send their clarification/ queries **on CPPP website** https://eprocure.gov.in/eprocure/app or queries may be sent ***to e-mail id – aksk@igcar.gov.in and sujish@igcar.gov.in***
xiii)	*Seek Clarification End Date and Time*	01.12.2025 (15:00 Hours)
xiv)	*Bid Submission Start Date and Time*	02.12.2025 (10:00 Hours)
xv)	*Bid Submission and Sale Closing Date*	09.12.2025 (15:00 Hours)
xvi)	Last date and time for submission of Original EMD	*On or before* 15.12.2025 (15:00 Hours) *at* **Superintending Engineer, MC&MFCG, Kalpakkam – 603 102, Chengalpattu District.** ***(Contact Phone No. 044-27480500 Extn: 22264/22023)***. The tenderer shall be required to submit the Earnest Money in a sealed envelope marked `***Earnest Money.'*** **Please note that, EMD shall be submitted in a sealed envelope clearly mentioning the Unit name IGCAR, Tender number & Name of work in a cover without fail.** However, documents sent by post or courier will also be considered provided the same is received within due date & time. *If the tenderer fails to submit original DD/BC/PO/DR etc., within the prescribed period as mentioned above those tenders will be summarily rejected.*
xvii)	Date and Time of online opening of Part-I (Technical Bid)	16.12.2025 (15:30 Hours) at the office of Superintending Engineer, MC&MFCG, IGCAR, Kalpakkam

xviii)	Period of verification of credentials for evaluation	17.12.2025 to 23.12.2025. [Except on 20.12.2025 & 21.12.2025] ***Note: Original documents substantiating the eligibility criteria all mentioned should be produced for verification during the above period. For outstation bidders who have difficulty in appearing in person original notary certified documents can be submitted by registered post. If the tenderers fail to submit original credential for verification, within the prescribed period as mentioned above those tenders will be summarily rejected.***
xix)	Evaluation of Part-I (Technical bid)	*Part-I evaluation will be done based on credentials submitted by the bidders for opening Part-II (Financial Bid). Inspection of eligible works will be carried out by Technical Evaluation Committee, if necessary.*
xx)	Date of opening of Financial Bids of qualified bidders	***Date and time will be notified later***
xxi)	*Minimum Bid/Offer validity period required*	**120 *Days from bid submission closing date*.**

Note: *Corrigendum/ Addendum/ Amendments if any shall be hosted on IGCAR/CPPP websites only. Bidders are requested to visit the website regularly.*

III. Eligibility Criteria:

3. **The bidders who fulfill the following criteria shall be considered for participation.**

3.1. ***JOINT VENTURES ARE NOT ACCEPTED.***

3.2. Experience of having successfully completed works during the last seven years ending previous day of last date of submission of tender as follows:

Three similar completed works each costing not less than the amount equal to 40 % of the estimated cost put to tender,

[or]

Two similar completed works each costing not less than the amount equal to 60 % of the estimated cost put to tender,

[or]

One similar completed work of costing not less than the amount equal to 80 % of the estimated cost under a single contract.

"Similar work" shall mean that "Any Electrical works"

Note:

i. Eligible similar nature of works should have been executed in India only.

ii. Works got executed on back to back basis through another contractor will not be treated as eligible works.

iii. In case of the similar work done under private sector, the completion certificate shall be supported with the copies of TDS certificate along with Form – 26AS

iv. The value of completed works shall be brought to current costing level by enhancing the actual value of work at **simple rate of 7% per annum**, calculated from the date of completion to previous day of last date of submission of tender.

3.3. Valid "ESB License" issued by the Tamil Nadu or other state Electrical Licensing Board.

3.4. Should have an average annual financial turnover for works/goods/services of at least **50% of the estimated cost** during the immediate last three consecutive financial years (FY ending 31/03/2025). Scanned copy of certificate duly audited by Registered Chartered Accountant to be uploaded.

3.5. Should not have incurred any loss (Profit after tax should be positive) in more than two years during the available last five consecutive financial years (FY ending 31/03/2025). Details shall be furnished as per Proforma as specified in Form – A, duly supported by figures in balance sheet/profit and loss account for the last Five (5) years duly audited by Registered Charted Accountant as submitted by the applicant to Income tax department.

3.6. Should have a Solvency of minimum **40%** of estimated cost obtained from competent authorities as per Proforma specified in Form – B. Scanned copy of solvency certificate shall be uploaded. The Solvency certificate should be valid on the last date of tender submission or the solvency certificate shall not be older than one year from the last date of tender submission.

3.7. The bidding capacity of the contractor should be equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the following formula:

Bidding Capacity = **[A x N x 1.5] – B**

Where,

A = Maximum turnover on works/goods/services executed in any one year during the last seven years taking into account the completed as well as orders in progress. The value of completed orders shall be brought to current costing level by enhancing at a simple rate of 7% per annum.

N = Number of years prescribed for completion of work for which bids has been invited.

B = Value of existing commitments and ongoing orders to be completed during the period of completion of work for which bids have been invited.

4. **The bidder shall fill the details in attached excel sheets (Forms) as detailed below and supporting documents should be scanned from originals and uploaded within the period of bid submission by the bidder: -**

4.1. Financial Turnover as specified in Form-A along with balance sheet certified by chartered accountant.

4.2. Similar class of work completed as specified in Form – C during last seven years ending previous day of last date of submission. In case of the similar work done under private sector, copies of TDS certificate along with Form – 26AS shall also be uploaded.

4.3. List of works/projects under execution or awarded as specified in Form – D.

4.4. Details regarding structure and organization of the firm as per Pro forma specified in Form – F.

4.5. Details regarding manpower possessed shall be furnished as per Pro forma specified in Form – G. The details of trained and certified workmen proposed to be employed at the work site of the project should also be furnished.

4.6. Details of tools, machineries and equipment likely to be used / possessed for carrying out the work shall be furnished as per Pro forma specified in Form – H.

5. **The bidder shall upload/submit the following documents and these documents should be scanned from originals and uploaded within the period of bid submission by the bidder**

5.1. ESB License

5.2. GSTIN

5.3. PAN

5.4. Solvency certificate as per Pro forma specified in Form – B.

5.5. Performance certificate of works referred to in Forms 'C' as per Pro forma specified in Form – E.

5.6. Form of Agreement

5.7. Registration with EPFO and ESIC

5.8. Annexure – 2: Tender Acceptance Letter (Scanned copy to be uploaded and originals shall be submitted during the period of verification of credentials)

5.9. Annexure – 3: Undertaking by Contractor (Scanned copy to be uploaded and originals shall be submitted during the period of verification of credentials).

5.10. Annexure – 4: Declaration by Contractor (Scanned copy to be uploaded and originals shall be submitted during the period of verification of credentials).

6. **Even though a bidder may satisfy the above requirements, the bidder would be liable to disqualification/ debarment if the bidder has: -**

6.1. Made misleading or false representation or deliberately suppressed the information in the forms, statements and enclosures required in the eligibility criteria document.

6.2. Any effort on the part of the bidder or his agent to exercise influence or to pressurize the employer. Canvassing of any kind is prohibited.

6.3. Record of poor performance such as abandoning work, not properly completing the contract, or financial failures / weaknesses, etc.,

6.4. Failed to produce originals of documents required for evaluation/qualification of the bidder. The Originals of the above Certificates shall be produced as and when called for. Irregularities if any observed will lead to rejection of the offer irrespective of the stage at which it is observed. Such bidders will be debarred for bidding in IGCAR as per applicable rule.

6.5. Breached the code of integrity. Firms will be debarred for a period of two years if it is determined that the bidder has breached the code of integrity as per Rule 175 and Rule 151 of GFR 2017.

6.6. Supply of sub-standard material, non-supply of material, abandonment of works, sub-standard quality of works, etc. Firms will be debarred for a period of two years for any actions or omissions by the bidder for other than violation of code of integrity, for the reason like supply of sub-standard material, non-supply of material, abandonment of works, sub-standard quality of works, etc.

IV. Information and conditions:

7. Information and instructions for tenderer posted on website shall form part of tender document for e-tendering mode.

8. Tender document is prepared in two parts viz. Part-I (Techno-commercial Bid) and Part-II (Financial Bid). The tender document consisting of plans, specifications, schedule of quantities of various types of items to be executed and set of terms and conditions of the contract to be complied with and other necessary documents. All the documents will form part of agreement after award of work to successful bidder.

9. The department reserves the right to accept/ reject any prospective application without assigning any reason thereof.

10. Tenderer to note that tenders with any condition including that of conditional rebate shall be rejected forthwith. However, tenders with unconditional rebate will be accepted.

11. Tenders will be received online up to time & date as mentioned in the NIT details above. Part-I will be opened on the time & date as mentioned in the NIT details above. The receipt of EMD will be checked first. If found in order, Part-I will be opened.

12. No modifications in the tender shall be allowed after opening Part –I (Techno-commercial Bid).

13. After opening of Part-I (Techno-commercial Bid) of tender, the online credentials submitted by the bidder will be verified with respect to their eligibility for the work and if required, visit to selected worksites of on-going/completed works of the bidders will be made to evaluate the capability of the bidders based on financial eligibility criteria, technical eligibility criteria, organizational structure of the bidder, etc., as stipulated in tender. Short listing of bidders shall be subject to thorough verification of bidder's credentials and inspection, if any, carried out. The Part-II (Financial Bid) of the qualified tenderers shall then be opened at notified date and time. Date of opening of Part-II will be intimated to all bidders through the CPP Portal website.

Note: During technical evaluation, missing documents if any, can be asked for submission.

14. The EMDs of the unsuccessful bidders will be returned without any interest only after the award of contract.

15. If any information furnished by the applicant is found to be incorrect at a later stage, they shall be liable to be debarred from tendering/ taking up works in IGCAR as per applicable rule. The department reserves the right to verify the particulars furnished by the applicant independently.

16. Tender will be kept valid for **120 (One Hundred and Twenty)** days from the last date of closing of online submission of tender.

17. If any tenderer withdraws his tender within the validity period and before award of work whichever is earlier or make any modifications in the terms and conditions of the tender which are not acceptable to the department, then the Government shall without prejudice to any right or remedy, be at liberty to forfeit 50 % (Fifty Percent) of the Earnest Money absolutely. Further, the tenderer shall not be allowed to participate in the re-tendering process of the work.

18. The tentative makes have been specified in the tender document based on requirements & desired performance and detailed study of the technical parameters, manufacturing process, quality assurance/control & testing. The list is merely for guidance and bidders can prefer any other make which is meeting technical specifications given under Section- V, Schedule of Quantities given under Section-VIII of Tender document, shall confirm to the relevant BIS codes and other relevant codes. **In case of non-approved make(s), the bidder(s) shall suggest such equivalent / alternate make / brand, meeting above-mentioned technical parameters, during pre-bid stage and before technical bid submission**.

19. The Financial Proposal/Commercial bid / BoQ format is provided as BoQ_aksk.xls along with this tender document at https://eprocure.gov.in/eprocure/app. Bidders are advised to download this BoQ_aksk.xls as it is and quote their offer/rates in the permitted column and upload the same in the commercial bid. **All tendered rates shall be inclusive of all**

taxes and levies payable under respective statute. Bidder shall not tamper/modify downloaded Financial Bid template in any manner. In case if the same is found to be tampered/modified in any manner, tender will be completely rejected and appropriate action will be taken by department. If it is desired to submit revised financial bid then, it shall be mandatory for the bidder to submit revised financial bid. If not submitted then, the bid submitted earlier shall become invalid.

20. Contractor must ensure to quote rate of each item. The column meant for quoting rate in figures appears in SKY BLUE colour. While selecting any of the cells a warning appears to mandatorily fill all such cells with any value, including "0" (ZERO) and if the bidder has quoted zero, then the rate of such item shall be treated as zero.

21. In case of successful tenderer, the tenderer is required to deposit an amount equal to 3% of the tendered and accepted value of the contract as irrevocable performance guarantee within a period of 15 days from the date of issue of Letter of Intent//Letter of Acceptance, in one of the following forms i.e. Deposit at Call Receipt/Bankers Cheque /Demand Draft or Fixed Deposit Receipt (FDR) of a scheduled Bank or an irrevocable bank guarantee bond of any scheduled bank in the prescribed form given in Annexure drawn in favour of Pay & Accounts Officer, IGCAR, Kalpakkam. Earnest Money deposited along with bid will be returned after receiving Performance Guarantee.

22. The letter of award of work will be issued only after the above said performance guarantee in any one of the prescribed form is received and accepted, failing which the Government shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the earnest money absolutely.

23. In addition to the above, the successful tenderer is required to remit security deposit amounting to 2.5 % [Two and half Percent] of the tendered and accepted value which shall be deducted at 2.5 % [Two and half Percent] of the gross amount of the bill from each running/final bill.

24. Bidder should have valid ESI & EPF registration and furnish the certificate of registration with EPFO and ESIC, for bidder's eligibility and qualification. The employer's contribution as per extant government orders shall be paid by the contractor which shall be reimbursed on production of documentary evidence. Hence the quoted rate shall not be inclusive of ESI & EPF employers contribution.

25. Bidders who do not have valid GST certificate as on the last date of online submission of the bid, are not eligible for this tender. Bidders shall submit an undertaking in the format provided in this document. Any subsequent defaulting in payment of GST by the bidder, will also be scrutinized by the department, and may lead to rejection of the bid/cancellation of contract.

26. **The rates quoted by the tenderer in the schedule shall be inclusive of Goods and Service Tax (GST) @18% or any other Tax applicable. GST or any other tax applicable as per extant orders in respect of this contract shall be payable by the Contractor and Government will not entertain any claim whatsoever in respect of the same.**

27. **Income Tax and TDS on GST as applicable from time to time, shall be deducted from each bill and deducted value will be remitted to the concerned tax authorities.**

Any other taxes / cess as per Government directives from time to time, shall be deducted from each bill paid to the contractor.

28. Bidders shall not be under a declaration of ineligibility for tender quoting and fraudulent practice.

29. Documentary evidence of adequate financial standing shall be furnished.

30. Information regarding projects in hand, current litigation, orders regarding exclusion, expulsion or block entry if any to be furnished.

31. The capacity of the contractor to take up a new project under consideration in addition to his present commitments must be clearly brought out. He should also furnish the details referring as to have both physically and financially capable of executing this contract in the stipulated time as per milestones projected in addition to executing the other commitments. Evidence of adequacy of working capital for this contract, access to lines of credit and availability of other financial resources shall be furnished.

32. Copies of original documents detailing the constitution or legal status, place of regulation and principal place of business, written power of attorney of the regulatory of the bond to commit the bidders shall be submitted.

33. Tenderer may please intimate their Bank Account Number, IFSC code, Branch details so as to enable the department for payments through Bank.

34. Qualification and experience of key site management and technical personnel proposed for the contract shall be intimated.

35. Information regarding any litigation, current or during the last seven years, in which the bidder is involved, the parties concerned and disbursed amount, shall be submitted .

36. Proposals for sub-contracting components of the works including the qualification and experience of the identified sub-contractor in the relevant field shall be submitted.

37. The proposed methodology and program of execution, backed with equipment planning and deployment duly supported with broad calculation and quality control procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones shall be furnished.

38. The contractor shall be responsible for the strict observance and implementation of all the safety precautions & procedures and house-keeping practices. The contractor shall comply with all the instructions given by the Engineer from time to time on these aspects in this regard.

39. The contractor shall comply with provisions of Contract labour act -1970, Workmen's compensation act 1923, Minimum wages Act 1948, EPF Act, Gratuity Act and other labour laws as applicable.

The contractor should intimate the maximum number of workmen//manpower/staff employed / likely to be employed by him to the Engineer in Charge, before commencement of the

work. All the workers are to be paid applicable minimum wages and payment is to be made through Bank transfer.

The contractor shall take workmen compensation policy for all workers employed by him, at site, for the subject work after the award of contract.

EPF, ESI and workmen's compensation policy contributions for all the workers on the part of employer in respect of this contract as applicable shall be paid by the contractor which shall be reimbursed on production of documentary evidence.
Records with respect to wages, PF, insurance, etc. of the workers shall be maintained & produced on demand for verification. In case of any failure to comply with these above provisions, Department shall be entitled to recover the same from the bills.

40. Eligible source countries: Any Bidder, from a country which shares a land border with India must comply to the Order (Public Procurement No.1) & Order (Public Procurement No. 2) issued by Public Procurement Division, Department of Expenditure, ministry of Finance, Government of India vide F. No. 6/18/2019-PPD dated 23.07.2020 and its addendum from time to time. Also, the bidder shall provide a undertaking as per Para – 9 of Annexure - 3. If such declaration or certificate is found to be false or to be incorrect at any time of submission of Bid or after awarding the Contract then, the said Contract will be terminated, along with such other actions as may be permissible under the relevant law of India.

41. **Superintending Engineer, MC&MFCG, IGCAR,** on behalf of President of India does not bind himself to accept the lowest or any other tender and reserves to himself the authority to reject any or all of the tenders or to allot PARTs of the works to different agencies without assigning any reasons there for. All tenders, in which any of the tender conditions is not fulfilled, shall be summarily rejected.

21/11/2025

Superintending Engineer,
MC&MFCG, IGCAR,
For and on behalf of the President of India

डॉ. वी. जयरामन / Dr. V. JAYARAMAN
असाधारण वैज्ञानिक / Outstanding Scientist
निदेशक / Director
पदार्थ रासायनि की और धातु ईंधन चक्र समूह
Materials Chemistry & Metal Fuel Cycle Group
इंदिरा गांधी परमाणु अनुसंधान केंद्र
Indira Gandhi Centre for Atomic Research
कल्पाक्कम / Kalpakkam

ANNEXURE – 1

GUIDELINES FORE-TENDERING IN CPPP WEBSITE

The instructions given in the annexure are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids on line on the CPP Portal. **As the instructions may change on CPP portal, the bidder shall follow the instructions given on the portal (**https://eprocure.gov.in/eprocure/app**) at the time of bidding.**

1. **Registration**

1.1. Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL:https://eprocure.gov.in/eprocure/app) by clicking on the link "Online Bidder Enrolment" on the CPP Portal which Is free of charge.

1.2. As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts. Bidders who have already registered and have valid user ID and password from https://eprocure.gov.in, need not to obtain fresh user ID and password for the purpose of participation in the present tender.

1.3. Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.

1.4. Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / nCode / eMudhra, etc.), with their profile.

1.5. Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.

1.6. Bidder then logs into the site through the secured log-in by entering their user ID / password and the password of the DSC /e-Token.

2. **Searching for Tender Documents**

2.1. The NIT & tender document consisting of specifications, drawings, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website **https://eprocure.gov.in/eprocure/app.** (NIT can also be viewed from **www.igcar.gov.in**)

2.2. There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, Organization Name, Location, Date, Value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as Organization Name, Form of Contract, Location, Date, Other keywords, etc., to search for a tender published on the CPP Portal.

2.3. Once the bidders have selected the tenders they are interested in, they may download the required documents/tender schedules. These tenders can be

moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS/e- mail in case, there is any corrigendum issued to the tender document.

2.4. The bidder should make a note of the unique Tender ID assigned to each tender, in case, they want to obtain any clarification / help from the Help desk.

3. Preparation of Bids

3.1. Bidder should take into account any corrigendum published on the tender document before submitting their bids.

3.2. Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid. **The tender shall be summarily rejected if any Financial Bid information is disclosed along with EMD or Technical Bid (Part-I).**

3.3. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF/JPG formats. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.

3.4. To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Space" or "Other Important Documents" area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

Note: *My Documents space is only are pository given to the Bidders to ease the uploading process. If Bidder has uploaded his Documents in My Documents space, this does not automatically ensure these Documents being part of Technical Bid.*

4. Submission of Bids

4.1. Bids shall be submitted online only at CPPP website : https://eprocure.gov.in/eprocure/app

4.2. Bidder should log into the site well in advance for bid submission so that they can upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.

4.3. The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.

4.4. Bidder has to select the payment option as "offline" to pay the EMD as applicable and enter details of the instrument.

4.5. Bidder should prepare the EMD as per the instructions specified in the tender document as applicable. The original should be posted/couriered/given in person to the concerned official, latest by the last date of bid submission or as specified in the tender documents. The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise the uploaded bid will be rejected.

4.6. The agency shall download the pre bid clarification if any for the work and upload the same (scanned copy) duly signed and sealed. The revised documents (if any) shall be uploaded in e tender portal.

4.7. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the Financial Bid has been given as a standard BoQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BoQ file, open it and complete the SKY BLUE coloured (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). **No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected**.

4.8. Tenderers are advised to upload their documents well in advance, to avoid last minute rush on the server or complications in uploading. IGCAR, in any case, shall not be held responsible for any type of difficulties during uploading the documents including server and technical problems whatsoever.

4.9. The server time (which is displayed on the bidders 'dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.

4.10. Submission of the tender documents after the due date and time (including extended period) shall not be permitted.

4.11. All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid opener's public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.

4.12. Upon the successful and timely submission of bids (i.e. after Clicking "Freeze Bid Submission" in the portal), the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.

4.13. The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. This acknowledgement may be used as an entry pass for any bid opening meetings.

4.14. Intending Bidders are advised to visit this website regularly till closing date of submission to keep themselves updated as any change/ modification in the tender will be intimated through this website only by corrigendum / addendum/ amendment.

4.15. After submission of the bid, the bidder can re-submit revised bid any number of times before last date and time of submission of bid/document as notified.

4.16. In the case of bids in two / three stage system, if it is required to submit revised financial bid then it will be mandatory to submit revised financial bid. If not submitted then the bid submitted earlier will become invalid.

5. **Assistance to Bidders**

5.1. Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.

5.2. Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk.

5.3. All bidders who have locked in (Not Guest Login) with their respective credentials in NIC & have downloaded tenders, must clicked on **FAVOURITE button**, so that the tender will move into their **FAVOURITE ZONE**, to get the uploaded corrigendum intimation from website.

5.4. Contact for assistance for registration and participation in e-Tendering:

i. 24x7 CPP Portal Helpdesk -(0120)4001 002, (0120)4001 005, (0120)6277 787

ii. Local Helpdesk - Shri. Bhushan / Shri. Mayur at (022) 25487480

iii. email at support-eproc@nic.in

ANNEXURE – 2

TENDERACCEPTANCELETTER

(To be given on Company Letter Head)

Date: _____

To.

The Superintending Engineer
MC&MFCG, IGCAR
Kalpakkam – 603 102

Sub: Acceptance of Terms & Conditions of Tender.

Tender Reference No: *IGC/MC&MFCG/PPED/PPEMS/ELE/AKSK/04/2025*

Name of Work : Contract for Periodic preventive maintenance of Electrical power distribution, Motor control centre (MCC) & blower motors, Furnace equipments with control panel and various electrical works in the PPRDF at MC&MFCG, IGCAR, Kalpakkam.

Dear Sir,

1. I/We have downloaded/obtained the tender document(s) for the above mentioned Tender/Work from the web site(s) namely: https://eprocure.gov.in/eprocure/app and www.igcar.gov.in as per your advertisement, given in the above mentioned website(s).

2. I/We hereby certify that I/we have read the entire terms and conditions of the tender documents (including Tender documents, annexure(s), schedule(s), corrigendum(s),Technical Specifications, Construction Safety Manual for Works Contract etc.,), which will form part of the contract agreement and I/we shall abide hereby by the terms/conditions/clauses contained therein.

3. The corrigendum(s)issued from time to time by your department/organization have also been taken into consideration, while submitting this acceptance letter.

4. I/We hereby unconditionally accept the tender conditions of above mentioned tender document(s)/corrigendum(s)in its to tality/entirety.

5. I/WedoherebydeclarethatourFirmhasnotbeenblacklisted/debarredbyanyGovt.Department/ Public sector undertaking.

6. I / We certify that all information furnished by our Firm is true & correct and in the event that the information is found to be incorrect/untrue or found violated, then yourdepartment/organizationshallwithoutgivinganynoticeorreasonthereforor summarilyreject the bid or terminate the contract, without prejudice to any other rights or remedy including actions as taken by Department.

Yours Faithfully,

(Signature of the Bidder, with Official Seal)

Annexure - 3

UNDERTAKING TO BE SUBMITTED BY THE BIDDER ON THEIR LETTER HEAD DULY SIGNED AND SEALED WITH DATE

(Scanned copy of the undertaking duly signed & sealed on letter head of the bidder to be uploaded at the time of submission of bid and original shall be submitted during the period of verification of originals).

Name of Work: Contract for Periodic preventive maintenance of Electrical power distribution, Motor control centre (MCC) & blower motors, Furnace equipments with control panel and various electrical works in the PPRDF at MC&MFCG, IGCAR, Kalpakkam.

NIT No. ***IGC/MC&MFCG/PPED/PPEMS/ELE/AKSK/04/2025***

1. I/We hereby give an undertaking that, I/we have read and I/we am/are aware of all the classes and sub clauses of tender forms and I/we confirm that, I/we will abide by all the terms and conditions available in this tender document.

My Income tax Permanent Account Number (PAN) is .....

2. I/We give an undertaking that, I/We am/are not GST defaulter(s). I/We give an undertaking that, GST certificate (No. .....) is a valid certificate. I/We also give undertaking that I/We will pay GST in time during the complete period of the contract.

3. I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for bidding in IGCAR in future as per applicable rule. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit / Performance Guarantee.

4. I/ We have read and examined the Notice Inviting Tender, General Rules & Directions, Form of tender, Special Conditions, safety code for Works Contract, General Conditions of Contract, Schedule-F, Specifications, Scope of work, Schedule of construction, drawings, schedule of quantities and all other contents in the tender document for the work AND ACCORDINGLY, I / We, hereby submit credentials and other documents as are provided for, by, and in respects in accordance with, such conditions so far as applicable.

5. I / We, hereby tender for execution of the work specified for the President of India within the time specified in schedule "F", viz., Schedule of Quantities and in accordance in all respects with the specifications, designs, drawings and instructions in writing referred to in Rule 1 of General rules & directions and in Clause – 11 of the General Conditions of Contract and with such materials as are provided for, by and in respects in accordance with, such conditions so far as applicable.

6. I / We have downloaded and gone through the pre-bid clarifications issued by the Department after close of sale of tenders and submitting tender accordingly.

7. I / We have gone through the "Additional Notes" sheet of financial bid/BOQ and submitting tender accordingly.

8. I / We have understood the entire scope of work and rates (inclusive of GST) quoted accordingly. We shall carry out the work as per Schedule of Quantities, technical specifications, drawing and complete the work within stipulated time to the entire satisfaction of the Department.

9. I/We have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India. I/We certify that, this bidder is not from such a country or from such a country has been registered with the Competent Authority. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered. I/We acknowledge the right of the department to terminate the Bidder for false declaration or certificate, along with such other actions as may be permissible under law.

10. I/We _____ (Name of bidder) undertake that, we meet the mandatory Local Content (LC) requirement for qualifying as 'Class I Local Supplier' as per the PP-LC Policy, against this tender. The percentage of Local Content in the bid is ____%.

11. I/ We do hereby give an undertaking that, none of my relative (s) as defined below is / are posted and/or working as AO/AAO or as an officer in any capacity in the grades of Scientific Officer-C/ Technical Officer-C and above in IGCAR(responsible for award and execution of contracts) as per details given in tender document. In case at any stage, it is found that the information given by me is false / incorrect, IGCAR shall have the absolute right to take any action as deemed fit without any prior intimation to me.

The near relatives for this purpose are defined as: 1) Members of a Hindu undivided family. 2) They are husband and wife. 3) The one is related to the other in the manner as father, mother, son(s), son's wife (Daughter-in-law), daughter(s), daughter's husband (Son-in-law), brother(s) and brother's wife, sister(s) and sister's husband (brother-in-law).

Signature with seal & date

Annexure – 4

DECLARATION TO BE SUBMITTED BY THE BIDDER ON THEIR LETTER HEAD DULY SIGNED AND SEALED WITH DATE

(Scanned copy of the declaration duly signed & sealed on letter head of the bidder to be uploaded at the time of submission of bid and original shall be submitted during the period of verification of originals).

Name of Work: Contract for Periodic preventive maintenance of Electrical power distribution, Motor control centre (MCC) & blower motors, Furnace equipments with control panel and various electrical works in the PPRDF at MC&MFCG, IGCAR, Kalpakkam.

NIT No. ***IGC/MC&MFCG/PPED/PPEMS/ELE/AKSK/04/2025***

1. This is to certify that:

   a. I /We have submitted the tenders in the Proforma as downloaded directly from the websites which are same as available in the website and there is no change in the format, number of pages etc.,

   b. I /We have not made any modifications / corrections / additions etc., in the tender documents downloaded from website by me / us.

   c. I /We have checked that no page is missing and all pages as per the index are available and that all pages of tender document submitted by us are clear and legible.

   d. I /We have submitted requisite EMD in the prescribed form.

   e. In case at later stage, it is noticed that there is any difference in my/ our tender documents with the original documents, IGCAR shall have the right to cancel the tender / work, forfeit the Earnest Money, Performance Guarantee & Security Deposit, take appropriate action as per the prevailing rules in force and IGCAR shall not be bound to pay any damages to me / us on this account.

I/We ..... (Name of the contractor/ agency) hereby declare compliance towards all the labour codes, legislations and statutory conditions or any other acts dealing with minimum wages, bonus, industrial relations, and social security and authorise **Indira Gandhi Centre for Atomic Research**, Department of Atomic Energy to recover any payment that arises due to failure to comply with any of the Labour Codes, legislations and statutory conditions or any other acts dealing with minimum wages, bonus, industrial relations and social security etc. and all other acts mentioned in the tender document.

Date: .....

(Dated Signature of
Contractor with seal)

FORM 'A': FINANCIAL INFORMATION

1. Financial Analysis – Details to be furnished duly supported by figures in balance sheet/profit and loss account for the last five years duly certified by the Chartered Accountant, as submitted by the applicant to the Income Tax Department: (Copies to be attached)

Particulars	Financial Years				
	2020-21	2021-22	2022-23	2023-24	2024-25
(a) Gross Annual turnover on works/goods/ Services orders (Rupees in Lakhs).					
(b) Profit/ Loss (Rupees in Lakhs).					
(c) Certified by					

Name and address of Chartered Accountant with Membership No.	

2. **Financial arrangements for carrying out the proposed work.**

   Viz. line of credit, Working Capital, Liquid capital, Fixed deposits etc., - Upload scanned copy of statement

3. **The scanned copies of following certificates are to be uploaded.**

   A. Profit & Loss statement certified by CA & as submitted to income Tax Department.

   B. Solvency Certificate from banker's of applicant. Banker's certificate should be on letter head of the bank. In case of partnership firm, certificate should include names of all partners as recorded with the bank as said in the Form "B"

   C. GSTIN

   D. Permanent Account Number (PAN)

Name & Address of authorised Signatory

Note: Further details if required may be asked from the contractor after opening of the bids. There is no need to upload the entire voluminous balance sheet.

(Scanned copy of Banker's letter head to be uploaded)

FORM 'B' - FORM OF BANKERS' CERTIFICATION FROM A SCHEDULED BANK

This is to certify that to the best of our knowledge and information that M/s. / Shri. ..... (with address) a customer of our bank are / is respectable and can be treated as good for any engagement up to a limit of Rs. .... (Rupees ....).

This certificate is issued without any guarantee or responsibility on the bank or any of the officers.

(Signature)
For the Bank

Note:

(1) Banker's certificates should be on letter head of the bank.

(2) In case of partnership firm, certificate should include names of all partners as recorded with the bank.

FORM 'C' - DETAILS OF ALL WORKS OF SIMILAR CLASS COMPLETED IN ALL RESPECTS DURING THE LAST SEVEN YEARS ENDING PREVIOUS DAY OF LAST DATE OF SUBMISSION OF TENDER

Sl. No.	Name of Work/ Project and location	Owner or Sponsoring *Organization*	Cost of Work in Lakhs of rupees	Date of Commencement as per Contract	Stipulated Date of Completion	Actual Date of Completion	Litigation/ Arbitration cases pending/in progress with details*	Name and address/ telephone number of officer to whom reference may be made	Remarks
1	2	3	4	5	6	7	8	9	10

Note: *Indicate gross amount claimed and amount awarded by the Arbitrator

Notes:

i. Applicant may submit separate form for giving details of work (completed) for each year to fill up the details as above. Separate sheets if any shall be numbered in sequence.

ii. The scanned copies of the work orders for each work along with completion certificate shall be uploaded.

iii. Certified that the above list of works is complete and no work has been left-out and the information given is correct to the best of my knowledge and belief.

Name & Address of authorised Signatory

FORM 'D' - PROJECTS UNDER EXECUTION OR AWARDED

Sl. No	Name of work/ project and location	Owner or sponsoring Organization	Cost of work (Rupees in Lakhs)	Date of commence-ment as per contract	Stipulated date of completion	Up to date percentage progress of work	Slow progress if any, and reasons thereof	Name and Address/ Telephone number of officer to whom reference may be made	Remarks
1	2	3	4	5	6	7	8	9	10

Certified that the above list of works is complete and no work has been left out and that the information given is correct to my knowledge and belief.

Name and address of authorised Signatory

Scanned copy of certificates containing following information from the clients to be uploaded

FORM 'E' - PERFORMANCE REPORT OF WORKS REFERRED TO IN FORMS "C"
(Separate certificate for each work/ Project)

a) Name of work/ project & location

b) Agreement No.

c) Name of Contractor

d) Estimated cost

e) Tendered cost

f) Completed cost

g) Date of start

h) Date of completion

   a. Stipulated date of completion

   b. Actual date of completion

i) Amount of compensation levied for delayed completion, if any

j) Amount of reduced rate items, if any

k) Performance report

Quality of work	:	Very Good/Good/Fair/Poor
Financial Soundness	:	Very Good/Good/Fair/Poor
Technical Proficiency	:	Very Good/Good/Fair/Poor
Resourcefulness	:	Very Good/Good/Fair/Poor
General Behavior	:	Very Good/Good/Fair/Poor
Time Consciousness	:	Very Good/Good/Fair/Poor

Dated:

Executive Engineer or Equivalent
Signature with Seal

FORM 'F' - STRUCTURE AND ORGANISATION

1. Name & Postal Address of the Applicant:

2. Telephone no. /Telex No. /Fax No.

3. Legal status of the Applicant (Please tick and attach attested copies of original document defining the legal status)

   a. An individual: (b) A proprietary firm: (c) A firm in partnership
   (d) A limited company or corporation

4. Particulars of registration with various Government Bodies (attach attested photocopy)

Dept./Organisation & Place of registration	Registration No.

5. Names and Titles of Directors & Officers with designation proposed to be concerned with this work.

6. Designation of individuals authorised to act for the organisation.

7. Was the Applicant ever required to suspend work for a period of more than six months continuously after he commenced the work? If so, give the name of the project and reasons of suspension of work.

8. Has the Applicant, or any constituent partner in case of partnership firm, ever been abandoned the awarded work before its completion? If so, give the name of the project and reasons for abandonment.

9. Has the Applicant or any constituent partner in case of partnership firm, ever been debarred/ black listed for tendering in any organisation at any time? If so, give details.

10. Has the Applicant or any constituent partner in case of partnership firm, ever been convicted by the court of law? If so, give details.

11. In which fields of Engineering Construction the Applicant has specialization and interest?

12. Any other information considered necessary but not included above.

Name and Address of authorised Signatory

FORM 'G' - DETAILS OF TECHNICAL & ADMINISTRATIVE PERSONNEL

TO BE EMPLOYED FOR THE WORK

Sl. No	Designation	Total Number	Number available for this work	Name	Qualifications	Professional experience and details of work carried out	How these would be involved in this work	Remarks
1	2	3	4	5	6	7	8	9

Name and Address of authorised Signatory

FORM 'H' - DETAILS OF TOOLS, MACHINERIES AND EQUIPMENT LIKELY TO BE USED IN CARRYING OUT THE WORK

Sl. No	Name of equipment/Plant	Nos.	Capacity or Type & make	Age	Condition	Ownership Status				Current location	Remarks
						Presently owned	Leased	To be purchased	Proposed to be hired		
1	2	3	4	5	6	7	8	9	10	11	12
1)	Hammer Drilling machine										
2)	Portable Drilling machine										
3)	Combination pliers										
4)	Screw driver sets										
5)	Allen keys set										
6)	Megger / Insulation tester										
7)	Earth tester										
8)	Digital multi meter										
9)	415 V Test lamps										
10)	Clamp meter/ Tong tester										

Name and Address of authorised Signatory

Form – 'I ' : Bidding Capacity Form

Maximum turnover in works/goods/service orders executed in any one year during the last five years taking into account the completed as well as works in progress. The value shall be brought to current costing level by enhancing at a simple rate of 7% per annum = (A)	
Year in which maximum turnover occurred	
Is audit report for the same is attached.(Yes/No)	
Number of years prescribed for completion of work for which bids has been invited = (N) N = completion period in months / 12	
Value of existing commitments and ongoing works to be completed during the period of completion of works for which bids have been invited = (B)	
Bidding capacity = (AxNx1.5)-B	

Signature of Bidder(s)

FORM - J : CHECK LIST

BEFORE SUBMITTING THE TENDER,THE TENDERER MUST CHECK THE FOLLOWING:

Say 'Yes' or 'No' or 'Not Applicable'

1. Have you uploaded the mandatory scanned documents such as Demand Draft or Banker`s Cheque or Fixed Deposit Receipts of any Scheduled Bank towards EMD? :
2. Have you filled schedule of quantities and unit rates in the Price bid? :
3. Do you agree to all the conditions of contract in to (Wherever you differ you should bring it out in the covering letter) :
4. Have you included all the necessary equipment instruments tools/tackles & labour, storage space etc. for completion of the job, whether specifically mentioned or not? :
5. (This is applicable for electrical contracts only)

   (i) Are you registered withTamilnadu State / or any other State Electrical Inspectorate? :

   (ii) If so, is scanned copy of the registration certificate is uploaded ? :
6. Have you uploaded all the required documents (Annexures 2-4, Forms A-I, Certificates, eligibility criteria documents etc) : :

(This form also should to be uploaded with the bid documents)

Address of Tenderer .....

.....

.....

Phone number ----------

Signature of Bidder(s)

SECTION II

FORM OF AGREEMENT AND GENERAL RULES AND DIRECTION FOR THE GUIDANCE OF CONTRACTORS

ITEM RATE TENDER AND CONTRACT FOR WORKS

(General PWD Code, Paragraph 95)

1. All works proposed for execution by contract will be notified in a form of invitation to tender posted in public places and signed by the Engineer.

This form will state the work to be carried out as well as the date for submitting / uploading and opening tenders, and the time allowed for carrying out the work, also the amount of earnest money to be deposited by the successful tenderer and the percentage, if any, to be deducted from bills. Copies of the specifications, designs and drawings and any other documents required in connection with the work signed for the purpose of identification by the Engineer- in - charge shall also be opened for inspection by the Contractor at the office of the Engineer in charge during office hours.

2. In the event of the tender being uploaded / submitted by a firm, it must be signed separately by each member thereof, or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power of attorney authorising him to do so, such power of attorney to be produced with the tender, and it must disclose the firm is duly registered under the Indian Partnership Act.

3. Receipts for payment made on account of a work, when executed by a firm, must also be signed by the several partners except where the contractors are described in their tender as a firm, in which case the receipts must be signed in the name of the firm by one of the partners or by some other persons having authority to give effectual receipts for the firm.

4. Any person who submits tender shall fill up the prescribed form, stating at what rate he is willing to undertake each item of the work. Tenders, which propose any alteration in the work specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other condition, of any sort, will be liable to rejection. Tenders shall have the name and number of the work to which they refer written outside the envelopes. The rate(s) and / or amount(s) must be quoted in decimal coinage both in words and figures.

5. The Engineer in charge or his duly authorised assistant will open tenders in the presence of any intending contractors who may be present at the time, and will enter the amounts of the several tenders in a comparative statement in a suitable form. In the event of a tender being accepted a receipt for the earnest money forwarded therewith shall there-upon be given to the Contractor who shall thereupon for the purpose of identification sign copies of the specifications and other documents mentioned in Rule-1. In the event of a tender being rejected the earnest money forwarded with such unaccepted tender shall thereupon be returned to the Contractor without any interest.

6. The officer inviting tenders shall have the right of rejecting all or any of the tenders and will not be bound to accept the lowest tender.

7. The receipt of an accountant or clerk for any money paid by the contractor will not be considered as an acknowledgment of payment to the Engineer in charge and the contractor shall be responsible for seeing that he procures a receipt signed by the Engineer-in-charge, or by the Accounts Officer or duly authorised cashier.

8. The tenderers shall sign declaration under the Officials Secret Act1923, for maintaining secrecy of the tender documents, drawings other records connected with the work given to them.(Applicable for manual tenders)

9. (a) Rates quoted by the contractor in Item Rate tender in figures and words shall be accurately filled in so that there is no discrepancy in the rates written in figures and words, however, if discrepancy is found the rate which correspond to the amount worked out by the contractor shall be taken as correct. (Applicable for manual tenders)

(b) If the amount of item is not worked out by the contractor or it does not correspond with the rate written either in figures or in words, then the rate quoted by the contractor in words shall be taken as correct and not the amount.

(c) Whether the rates quoted by the contractor in figures and in words tallies, the amount is not worked out correctly the rate quoted by the contractor shall be taken as correct and not the amount.

10. In case of any tender where unit rate of any item / items appear unrealistic, such tender will be considered as unbalanced and in case the tenderer is unable to provide satisfactory explanation, such a tender is liable to be disqualified and rejected.

11. In event no rate has been quoted for any item(s) then rate for such item(s) will be considered as zero.

12. If it is found that the tender is not submitted in proper manner or contains too many corrections and/or absurd rates, or amount, it will be open for the Government to take suitable disciplinary action against the Contractor.

13. The contractor shall submit the list of both gazetted and non-gazetted staff who were Ex-employees of DAE and are related to him (if any).

ITEMRATETENDERFORWORKS

I/We hereby tender for the execution for the President of India of the works specified in the under written memorandum within the time specified in such memorandum at the rates specified, therein and in accordance in all respects with the specifications, drawings, designs and instructions in writing referred to in Rule I here of and in clause II of the conditions of the contract and with such materials as are provided for by and in all respects in accordance with such conditions so far as applicable.

MEMORANDUM

a) General Description Contract for Periodic preventive maintenance of Electrical power distribution, Motor control centre (MCC) & blower motors, Furnace equipments with control panel and various electrical works in the PPRDF at MC&MFCG, IGCAR, Kalpakkam

b) Estimated cost :Rs. **25,00,000 /-**

c) Earnest Money :Rs. **50,000 /-**

d) Security Deposit :Rs. **62,500 /-**

e) Performance Guarantee : Rs. **75,000 /-**

In case of successful bidder, Security deposit amounting to 2.5% of the tendered value @ 2.5% of the gross amount of the bill will be deducted from each running bill, till the sum will amount to security deposit of 2.5% of the tendered value of the work.

In addition, the successful bidder is required to deposit an amount equal to 3% of the tendered value of the contract as irrevocable performance guarantee in the form of bank guarantee or by Demand Draft from any one of the scheduled bank.

Time allowed for the work_____

Should this tender be accepted, in whole or in Part, I/ We here by agree:

(i) To abide by and fulfil all the terms and provisions of the said conditions as far as applicable and or in default thereof to forfeit and pay to the President of India or his successors in office, the sum of money mentioned in the said conditions. A sum of Rs.....is hereby forwarded in deposit at Call receipt of a Scheduled Bank guaranteed by the Reserve Bank of India as earnest money. If I/We fail to commence the work specified in the above memorandum, I/We agree that the said President or his successors in office shall without prejudice to any other right or remedy be at liberty to forfeit the said earnest money absolutely otherwise the said earnest money shall be retained by him towards security deposit mentioned against clause (d) of the above mentioned memorandum;

(ii) to execute all the works referred to in the tender documents upon the terms and condition contained or referred to there in and to carry out such deviation as may be ordered resulting thereby either an increase in the total value of contract to the extent of25% or decrease in the total value of contract to the extent of 20% and to the event of exceeding these limits the rates to be determined in accordance with the provisions contained in clause 12 of section IV of the tender form.

Dated the_____day of_____20___

Signature of Witness:

Signature of contractor
before submission of tender.

Address:

Occupation:

The above tender is here by accepted by me on behalf of the President of India.

Dated the_____day of_____20___

Signature of the officer
by whom accepted

ADDITIONALRULESANDDIRECTIONSFORTHEGUIDANCEOFTENDERERS

1. The Tender shall be valid for a minimum period of FOUR Calendar Months from the date of opening of Tender (Technical bid).

2. The Tender Document including the Drawings shall be signed by the Tenderer and returned / uploaded along with his offer for this work.

3. If any Tenderer withdraws from this tender within its validity period or makes any modifications in the terms and conditions of the tender which are not acceptable to the Department, then Government shall without prejudice to any other right or remedy be at liberty to forfeit 50%(Fifty Percent) of the Earnest Money absolutely.

4. The tenderer shall note that after the award of the work a comprehensive Agreement setting out all the terms and conditions finally agreed upon between the Contractor and Government will be drawn up and signed by both the parties to the Agreement.

6. Schedule of rates:

Rates, quoted shall include labour, materials, tools, plant, appliances, transport, Shipment, GST and any other taxes, duties levied by Government, in pursuant constitution 46th Amendment Act, 1982, Water and Power Supply, metering and consumption charges, temporary plumping, cost of storage sheds for materials, Contractor's supervision, overheads and profit, general risks or liabilities and all that are necessary for the satisfactory completion of the job. The rate shall be firm and shall not subject to the exchange variations, labour conditions or any conditions whatsoever.

7. Tender rates to be inclusive of GST:

The rates quoted by the Tenderer shall also be inclusive of GST & Applicable taxes & Cess applicable time to time during the execution of the Contract/Works. No separate claim to this account will be entertained by the Department.

Any other taxes/ Cess as per the Govt. directions/orders will be deducted from the payment made to the contractor in time to time.

IMPORTANT NOTE: The Contractor shall place the Deposit at Call Receipt or Demand Draft towards the "*Earnest Money "and "the Tender" in separate sealed envelopes marked "Earnest Money" and "Tender" respectively. Both the envelopes shall then be placed in an another sealed envelope and submit to the tender inviting authority in the usual manner*. In case the "Earnest Money is not deposited or is not in order the bid shall be disqualified.

SECTION III

SPECIAL CONDITIONS

1.0. LOCATION

DAE Complex at Kalpakkam is located about 90 Kms from Chennai near Sadhurangapattinam. The site is accessible by road from Chennai via Chengalpattu, Thirukkazhukundram and also via Mamallapuram by East Coast Road. The Contractor may note the severe climatic condition existing in the region with co-incident humidity, salt laden atmosphere and high temperature.

2.0 SITEINVESTIGATION

The contractor acknowledge that he has satisfied himself as to the nature and location of the work, the general and local conditions, particularly those bearing upon transportation, disposal, handling and storage of materials, availability of labour, water, electric power, roads and uncertainties of weather, or similar physical conditions of the site, the confirmation and conditions of the ground, the character, the quality and qualities of surface and sub-surface materials to be encountered, including the subsoil water levels, the character of equipment facilities needed preliminary to and during the progress of the work, and all other matters upon which information is reasonably obtainable and which can in any way affect the work or his cost thereof under this contract. Any failure of the contractor to acquaint himself with all the available information concerning these conditions will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the work. Non-familiarity with the site conditions will not be considered a reason either for extra claims or for not carrying out the work in strict conformity with drawings and specifications.

The contractor shall be deemed to have visited the site to acquaint himself with the site conditions, approaches, availability of materials, camping facilities for his labour force, geological and weather conditions and all other relevant information required for Tendering before submitting / uploading his tender.

The contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the work and to the rates in the schedule of quantities and rates which shall cover all his obligations under the contract and all matters and things necessary for the proper completion and maintenance of the works.

The contractor shall note that any clarifications regarding specifications, conditions of contract, schedule of quantities, scope of work etc. are required, he should contact

the office of the Engineer. No claim on account of ambiguity in any respect will be entertained.

3.0 SCOPE OF WORK

The work to be done under those specifications consists of furnishing all equipment/materials, labour, tools, equipment and services and performing all work (except work, equipment and materials specified to be performed or furnished by the Department) required to execute the work specified in the tender, and all other work required to satisfactorily complete construction in strict accordance with the specifications and drawings enclosed / uploaded. It is intended that the drawings and specifications include everything requisite and necessary to finish the entire work properly. Notwithstanding the fact that every item necessarily involved may not be specifically mentioned, all work when finished shall be delivered in a complete and undamaged.

4.0 STANDARDS AND SPECIFICATIONS

For all equipment, materials and work BIS specifications and standards should apply in general. Where BIS standards do not exist, relevant International ElectroTechnical Commission (IEC), IEEE, ASME Specifications will apply. All specifications, standards, publication, etc. specified mean the latest edition of standards and amendments. In the case of any class of work for which no standards have been specified, such works shall be carried out in accordance with the specifications and requirements given by the Engineer.

Equipment and installation covered under this contract shall conform to the standards with their latest amendments specified in the respective Sub Sections of Section V - Technical Specifications of the Tender Document.

The Engineer reserves the right to reject any material not meeting the intent and requirements of the specifications/standards and Contractor will have no claim for any damages, loss or compensation on this account.

5.0 DRAWINGS

The work shall also conform to the drawings issued by the Engineer, and to such other drawings relating thereto as may be furnished from time to time during construction by the Engineer in explanation of details of modifications, including such modifications, as the Engineer may consider necessary to meet conditions found during the progress of the work.

The contractor shall give two weeks notice in writing to the Engineer of any further drawings or specifications that may be required for the execution of the work as otherwise under the contract. The Engineer shall have full powers and authority to supply to the contractor from time to time during the progress of the work such further drawings and instructions as shall be necessary for the purpose of the prompt and adequate executions and maintenance of the

Works and the contractor shall carry out and be bound by the same.

It shall be understood that drawings furnished to the contractor shall be interpreted by the use of given dimensions, and nomenclature only, and that the drawing shall not be scaled.

Prior to the execution of the work, the contractor shall check all drawings and shall immediately report all errors, discrepancies and/or omissions discovered therein to the Engineer. All such errors discrepancies and/or omissions will be adjusted by the Engineer. Any adjustment made by the contractor without prior approval of the Engineer shall be at his own risk and the settlement of any complications arising from such adjustment shall be made by the contractor at his own expense.

In case of difference between drawings and specifications, the specifications shall govern. Anything mentioned in the specifications, and not shown on the drawings, or, shown on the drawings and not mentioned in specifications, shall be of like effect as if, shown or mentioned in both.

The installation drawing should be submitted to the Engineer within 4 weeks from the date of the award of the contract. At the first instance the contractor will forward a set of the foundation drawings for all the equipments so as to enable to commence the construction activity. He will also suggest any modifications if required, on the structural aspects of the building to accommodate the electrical equipment.

After completion of the work, all the drawings issued by the Engineer from time to time shall be returned by the tenderer to the Engineer. Final payment will be made only after the drawings have been received by Engineer.

6.0 CONTRACTOR'S / VENDOR'S DRAWINGS

The drawings consisting of such detailed drawings as are not included in the contract drawing or larger scale details of certain parts of the work indicated on the contract drawings, shall be complete and shall contain all required detailed information as may be reasonably required for satisfactory execution of the work.

Drawings to be furnished by the contractor shall be included in the bid price of this work. Approval of the Contractor's / Vendor's drawings shall not be construed as authorising additional work or increased costs to the department. Adjustment in the bid price or any extension of time to cover required charges in the Contractor's / Vendor's drawings to comply with the requirements of the contract specifications, shall not be permitted.

Prior to submittal for approval, the contractor shall be responsible for thoroughly checking all drawings whether prepared by him or by his Vendors to ensure that they comply with the intent and the requirements of the contract specifications, and that they fit with in the specified location. Drawings found to be inaccurate or otherwise in error will be returned for

Correction by the contractor to his vendors for re-submittal.

The Engineer-in-charge will review and return three copies of each drawing to the contractor, marked either “APPROVED” or “APPROVED AS NOTED” or “NOT APPROVED”. When approved, each copy of the drawings will be identified as having received such approval by being stamped and dated. If the drawings are approved as noted, the contractor shall make the indicated corrections immediately and may proceed with the work as though the drawings had been approved. If unapproved, the contractor shall make all required corrections, immediately and resubmit drawings as above until they are approved or approved as noted.

After the contractor has made the corrections to unapproved drawings, the contractor shall submit six copies of each corrected drawings to the Engineer who will return three approved copies to the contractor.

The approval of the drawings by the Engineer shall not be construed as a complete dimensional check, but will indicate only that the general method of construction and detailing is satisfactory. Approval of such drawings will not relieve the contractor of the responsibility for any errors or compliance with requirements of the tender drawings and specifications, nor will any discrepancy between tender drawings and specifications. The contractor shall be responsible for design, dimensions adherence to the specification with respect to design, manufacture/fabrication and completeness. Any work done such as fabrication /manufacture /erection setting at site in advance of the receipt of approved drawings shall be done entirely at the contractor’s risk.

7.0 SITE ORGANISATION

The contractor shall furnish a list of plant and equipment that he proposes to bring to site for the execution of the work. He shall also furnish full details of Engineering and Managerial Organisation along with the names and experience of Senior Engineers and supervisors and technicians who will be posted by him for this work.

8.0 CONTRACTOR’S TOOLS & PLANTS

The Contractor shall furnish with the tender a list of plant and equipment that he proposes to bring to site at his own cost for the execution of the work, to enable Engineer to assess its safety, suitability and his mode of execution of work. List of such equipment, tools and tackles of the contractor as and when brought to site shall be through a proper Delivery Challan and shall be got certified by the Security Officer giving the details of date and time of entry of such materials. Certified copy of delivery challan shall be produced to the Engineer for his reference and records.

9.0 CONTRACTOR’S EMPLOYEES

The contractor shall provide and employ on the site in connection with the execution and maintenance of works:

a) Only such technical assistants, as are skilled and experienced in their respective callings and such sub-agents, Foremen and leading hands as are competent to give proper supervision to the work, they are required to supervise.

b) Such skilled, semi-skilled and unskilled labour as necessary for and timely execution and maintenance of works. It is to be ensured that all the employee and workers employed by the contractor are law abiding citizens, with clean record. Anti-social elements rowdies and persons with adverse police records should not be employed on the works at Kalpakkam.

c) The Engineer shall be at liberty to object to and require the Contractor to remove forthwith from the works any employed persons by the contractor in or about the execution or maintenance of the works who in the opinion of the Engineer misconducts himself or is incompetent or negligent in the proper performance of his duties or whose employment is otherwise considered by the Engineer to be undesirable and such persons shall not be again employed upon the works without the written permission of the Engineer. Any persons so removed from the works shall be replaced as soon as possible by a competent substitute approved by the Engineer.

The contractor shall arrange adequate facilities for medical aid and treatment for his staff and workers engaged on this work.

10.0 GOVERNMENT LABOUR LAWS

The contractor has to follow strictly the Government labour act which are in force at present and all necessary arrangements for labour will have to be made by the contractor.

CONTRACT EMPLOYEE SALARY

The Contractor shall follow the Government labour act and shall follow minimum wage sact:

(The rate is fixed by the labour department periodically and same rate shall be paid to the contract employees) All contract employees' salaries shall be paid by cheque /online payment. Check issue will be supervised by the representative of Engineer – in- Charge". In case of online payment proof of the same shall be furnished for all employees on monthly basis.

REGISTRATION REQUIREMENT:

For all tenders, the contractor has to register with the labour commissioner as admissible by the prevailing rules. For this purpose the successful bidder has to apply for the Principle employer certificate with in one week of award of the work order and complete the formalities of registration within one month of award of work order. IGCAR, Kalpakkam will issue the principle employer certificate after receiving the request from the contractor.

STATUTORY BENEFIT TO THE PERSONNEL EMPLOYEE

The Contractor shall be responsible for providing all statutory benefit to the personnel employed by him like minimum wages, bonus, EPF, ESI etc., as applicable and comply with all the Labour Codes, legislation and statutory conditions or any other acts dealing with minimum wages, bonus, industrial relations and social security.

11.0 SAFETY

To avoid possible accidents to contractor's staff and labour employed on the construction, it is imperative to observe the safety practices specified in "Section IV –Conditions of Contract" and these will be strictly enforced by the Engineer, Ladders and working platforms shall be rigid and sturdy and be provided with hand rails. The contractor shall provide for all his personnel at work site, necessary safety helmets. Safety belts shall be provided for workers employed at high elevation and in risky work areas. Catch nets shall be provided below working platforms located at high elevations. The cost of providing for all safety practices shall be included by the contractor in his rates quoted for the various items in the schedule of quantities.

12.0 SECRECY

The contractor, his employees and agents shall not disclose to anyone except to the limited extent required for the purpose of execution of the contract, any information or drawings, furnished, to him by the Engineer. All drawings reports and other information prepared by the contractor / by Engineer or jointly by both for the execution of the contract shall not be disclosed without the prior approval of the Engineer. No photographs of the works or plant within the site premises shall be taken without the prior approval of the Engineer.

13.0 SECURITY RULES

The Contractors may please note that the identity cards shall have the photos of the personnel concerned control of entry of personnel and all similar matters. The contractor and his personnel shall abide by all security measures imposed by the Engineer or his duly authorised representative from time to time.

The contractor shall follow at site all Security Rules as may be framed by the Government from time to time regarding removal of materials from site.

The contractor shall also observe all the safety rules and codes issued for this work by the Engineer from time to time.

14.0 ACCOMMODATION

The Department will not provide any quarters for the accommodation of contractor's personnel. No land will be made available within the project area for the construction of staff and labour quarters for the contractor. The contractors will make his own arrangement for leasing suitable accommodation / land for housing his personnel and the cost on this account should be included in his rate structures.

15.0 WATER

The contractor should make his own-arrangement for the supply of water required for the works. Water supply if available shall be made available to the contractor at one point from the existing water mains and the contractor shall arrange for installing water meter as approved by the Engineer and lay all further piping to the various work sites at his own cost. He shall install all pumping equipment, lay all piping and construct overhead tanks requiredto supply water to the variouswork spots at his own cost. The pumpingplants, overhead tanks and piping shall be maintained by the contractor at his own cost. The capacity of the overhead tanks to be provided by the contractor shall be adequate to take care of possible interruptions in pumping. The maximum consumption rate ofwater for construction purposes shall be stated along with the tender for purposes of planning. The charges for water supply shall be metered and recovered from the contractor from the running bills at therate specified in Schedule-F.

Not applicable

The Engineer will not be liable for any loss or damage as a result of any variation, stoppage, failure or of interruption in water supply. In the event of any failure, interruption or stoppage of water supply for a continuous period not exceeding 24 hours the Contractor shall have no claim whatsoever against the Government. For any water supply failure stoppage or interruptions for a continuous period exceeding 24 hours due to causes attributable to the Government, the Contractor will be eligible for only reasonable extension of time as may be decided by the Engineer and not for any compensation of this account.

16.0 POWER SUPPLY

(a) For purposes of planning, the Contractor shall furnish along with the tender, the estimated requirement of electric power for the execution of the work in terms of maximum KW demand.

(b) The construction power supply will be made available to the Contractor at a nominal system voltage of 415 V, 3 phase, 50 c/s. The power supply to the Contractor will be made available subject to the following terms and conditions.

i) This power shall not be used for any other purpose other than this work.

ii) The supply will normally be made available at one point in the work site with

reference to the load requirements as decided by the Engineer in-charge. The contractor shall make his own arrangements for the distribution of power to all his works from the point to supply through RCCB with 30mA sensitivity.

iii) The Contractor shall provide required electrical panel to receive the incoming cable. The incomer of the panel provided by the contractor shall contain tripping provision for over current and earth faults. An energy meter of class-1 accuracy shall be provided for the incomer in addition to a voltmeter and ammeter. The Engineer shall meter the supply of power to the Contractor. For this purpose, the Contractor will be liable to pay the rent of meter at the rates as specified in Schedule-F, if the meter is provided by the department. If there is any dispute on accuracy of meter, the meter under dispute shall be calibrated in a Standards Laboratory (ETDC, Chennai) and the meter shall be replaced if required. No request for the rebate on past consumption will be entertained. The fees levied by the ETDC / standard laboratory for testing the meter shall be collected from the Contractor. The Engineer may at his discretion replace any meter installed.

iv) It shall be the responsibility of the Contractor to provide and maintain the complete installation on the load side of the supply with due regard to the safety requirements at site. All cabling and installations shall comply in all respects with appropriate statutory requirements given in the following:

a) Indian Electricity Act

b) Central Electricity Authority regulations (Measures relating to safety and Electric Supply)

v) The power supply will also be regulated by the Engineer in line with the availability of power from MAPS & BHAVINI.

vi) The Contractor shall maintain the power factor at not less than 0.85, by installing if necessary, at his own cost, suitable corrective devices. The Contractor's failure to take up necessary action in this regard within a period stipulated by the Engineer may entail installation of the necessary corrective devices by the Engineer at the Contractor's risk and cost. All electrical installation made by the contractor at work site will be subjected to periodical inspection of the Engineer or his authorized representative.

vii) The Engineer will not be liable for any loss or damage to the contractor's equipment as a result of variations in voltage or frequency or interruption in power supply for a continuous period not exceeding 24 hours, the contractor shall have no claim whatsoever against the Government. For any power failure/stoppage resulting in interruptions for a continuous period exceeding 24 hours, the contractor will be eligible only for reasonable extension of time and not for any compensation on this account. The decision of the Engineer with regard

To the grant of extension of time and its reasonableness, if granted shall be final.

viii) The Engineer will not be liable for any loss to the Contractor arising from interruption, failure or stoppage of

ix) works and any attendant delays consequent upon such interruptions, failure or stoppage of power supply or variations in voltage or frequency.

x) Recoveries for the power supplied for construction purpose shall be made from the running account bills of the Contractor at the rate of as specified in Section-V.

xi) After completion of the works, the Contractor shall promptly dismantle at his own cost, the distribution and other facilities he may have erected.

17.0 POWER AND ELECTRICAL SAFETY

i) The Department will provide 415 V, 3 phase, 4 wire supply at one location. The energy consumption will be metered and charged as specified in Section-V.

ii) The Contractor will make arrangements for receiving the power supply. He will have a distribution switchboard with one number incomer switch with HRC fuses and sufficient number of outgoing feeders, properly with HRC fuse protection. Sub-distribution boards may be provided and wired from the distribution board by the Contractor. Cabling from the meter and supply point to the distribution board will be done by the Contractor. The distribution board and other locations shall be provided with danger boards with skull mark.

iii) Single phase loads will be connected such that the loads and the 3 phases are balanced.

iv) All distribution boards and sub-distribution boards will be properly grounded with 2 ground connections and each board will have one independent pipe earth electrodes.

v) All electrical equipment like switches, motors and power outlets shall be properly grounded and shall be well protected from weather (rain and dust).

vi) Equipment with electric prime movers will be installed in permanent manner as far as possible with fixed cabling. Insulated wires in metallic conduits can substitute for armoured cables, if required.

vii) Portable lights and equipment (limited to unavoidable tools like vibrators, drills and polishing machine) will be connected using metal clad sockets and plugs to avoid mechanical damage.

viii) Insertion of wires in sockets will not be permitted.

ix) All portable appliances shall be properly grounded.

x) All portable electrical tools will be tested and certified by authorized staff. Contractor's Electrical Supervisor may be authorized for the work by the Department at its discretion.

xi) Cablingandwiringwillberunundergroundwithpropermechanicalprotectionoroverhead

beyond normal human reach so as to avoid hindrance to movement of men and materials. Cable route indicators shall be provided as directed by Engineer-in-Charge wherever cables are run underground.

xii) For temporary connections 3 Core insulated and sheathed cables will be used for single phase and 4 core insulated and sheathed cables will be used for 3 phase wiring, Armoured cables will be preferred.

xiii) Un armoured cables will not be tied to metal supports using metal wires.

xiv) All wires used shall be healthy and joints shall be minimum. The joints shall be properly insulated and shall be approved by Departmental Engineer. Joints shall be properly supported and positioned above normal human reach. Joints shall not be permitted in wet areas. Loose wiring will not be allowed over floor, Extra length of wires and cables shall be properly coiled and kept in safe position.

xv) Electrical works including temporary connections and extensions will be carried out by licensed electricians only. All electrical installations will be energized only after approval by the Department.

xvi) List of electrical staff to be posted at site will be furnished by the Contractor before the commencement of Contract.

xvii) Adequate area lights will be provided by the Contractor to ensure safe working.

xviii) Departmental electrical staff will be available at Site for rectification of faults up to metered point during normal working hours on normal working days. Contractor's qualified staff will maintain the Contractor's electrical installations.

xix) The contractor will allow free access to departmental safety engineers for inspection of electrical connections and distribution systems and abide by their decisions, in the interest of safety of personnel. The contractor also will avail the industrial safety and related training being provided by the department free of cost and ensure that most of the field staff are trained adequately.

Note: deleted

18.0 LAYOUT

The contractor shall layout his work from base lines and grades established by the Department and shall be responsible for all measurements connection therewith. The contractor shall, at his own expense furnish all stakes, templates, platforms, equipment, ranges and labour that may be required in setting and cutting or laying out any part of the work. The contractor shall be held responsible for the proper execution of the work to such lines and grades as may be established or indicated on the

Drawings and specifications.

The checking of any setting out or of any line of level by the Engineer shall not in any way relieve the contractor of his responsibility for the correctness thereof and the contractor shall carefully protect and preserve all bench marks, site rails, pegs and other things used in setting out the works of alignment of any part of the work.

The contractor shall check the benchmarks and benches existing at the site for laying out line sand levels. The Contractor is to construct and maintain proper benches at the inter-section of all main walls in order that the lines and levels may be accurately checked at all times. The odolites, levels, prismatic compass, chain, steel and metallic tapes and all other surveying instruments found necessary on the works shall be provided by the contractor at his cost.

Adequate lighting facilities such as floodlights, hand lights and area lightings shall be provided by the contractor at his own cost at the site of construction and storage of his materials and equipment and temporary access roads within his working area.

The contractor shall obtain approval of the Engineer to the lighting scheme provided prior to its installation.

19.0 DRAINAGE ARRANGEMENTS

The contractor shall control the grading in the vicinity of the buildings and trenches, so that surface water is prevented from running into excavated areas. The contractor shall also be responsible to see that no area around-his works becomes flooded during rainy season because of his piles up materials etc. and subsequently flood other buildings. At the discretion of the Engineer the contractor shall take steps to prevent flooding. It shall be the contractor's responsibility to keep areas around his work dry. The cost of repairing flood damage shall be the sole responsibility of the Contractor.

20.0 ROADS

The contractor will be required to construct suitable approach roads leading to the construction site from the main road and maintained the same at his own cost. Such roads to be laid by the contractor shall conform to the specifications of the Engineer and location of such roads shall be subject to the prior approval of the Engineer.

The contractor may use the roads formed by the Government in the vicinity of the works for transport and haulage of materials. All roads at the work site, including any road formed by the contractor will be made use of by other contractors and agencies at site and the

contractor is not entitled for any payment from the Government or compensation on this account.

21.0 EXTRAORDINARY TRAFFIC

The contractor shall use every reasonable means to prevent any of the highways or bridges communicating with or on the routes to the site from being damaged or injured by any traffic of the contractor or any of his sub-contractors and in particular shall select routes, choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of plant and materials from and to the site be limited as far as reasonably possible so that no unnecessary damage, or injury may be occasioned to such highways and bridges.

22.0 TRAFFIC INTERFERENCE

The contractor shall conduct his operations in DAE Complex, Kalpakkam so as to interfere as little as possible with the use of existing roads at or near locations where the work is being performed. When it is necessary to excavate a trench across an existing roads in DAE Complex, Kalpakkam and store materials thereon or perform other work which would obstruct traffic, notification of the start of such work or storage of materials, and details of the proposed methods of providing the required facilities for safe and continuous use of roads shall be submitted to the Engineer at least 48 hours in advance thereof, and. the contractor shall at his own expense, make such approved temporary provisions as are required to maintain at least one lane of traffic by bridging the excavation, providing ramps over surface obstructions or providing suitable temporary by-pass around the obstructions. The contractor shall provide and erect, before construction, substantial barricades, bridging over trenches, ramps sidewalks, guard rails and warning signs, furnish, place and maintain adequate lights and warning signals and provide flag man, watchman as directed by the Engineer. Storing of materials along/across the roads will not be permitted.

23.0 SITE MANAGEMENT

The contractor shall construct all storage areas and yard facilities he may require for the performance of the contract at his own expense. Location of such areas and yards shall be subject to the prior approval of the Engineer. All temporary structures and facilities put up for the performance of this contract at various places shall be dismantled by the contractor after the completion of contract and the area handed over to the Engineer in a clean condition to the satisfaction of the Engineer.

The contractor shall at all times keep the site of work free from accumulation of waste materials and debris in all his areas of activity and shall dispose of all wastes, rubbish, etc. regularly. The contractor shall also dismantle all temporary works of whatsoever

Nature and kind as directed by the Engineer and shall leave the site clean and tidy.

During the execution of the contract and until completion certificate is issued, the contractor will fully be liable to compensate all concerned for any, loss, damage or destruction of "works", structures, plant and machinery, person, property, etc. includingthirdpartyriskarisingduetocausesattributabletothecontractorasmaybe decided by Engineer whose decision in this regard will be final. No claim shall be made against the Government on this account. The contractor shall employ security personnel ay his own cost to protect the equipment and all material/installations until the entire work is completed and handed over to the Engineer.

24.0 STORAGE

All materials shall be stored so as to prevent deterioration or contamination by foreign matters and to ensure the preservation of their quality and fitness for the work. If the storage arrangement is not to the Engineer's satisfaction, the Engineer may direct the contractor to make such arrangements as he considers necessary and in the event of non-compliance, he would reserve the right to make proper arrangements departmentally or through other agencies at contractor's cost. All materials shall be stored in adequate quantities well, in advance to meet the construction schedule.

25.0 PROGRESS & COMPLETION

The contractor shall furnish sufficient forces, construction plant and equipment, and shall work such hours, including overtime operations, as may be necessary to ensure the progress of the work in accordance with the construction schedule indicted by the Engineer and its completion within the time specified in this contract. If in the opinion of the Engineer, the contractor refuses or fails to comply with this obligations set for thin the preceding sentence, the contractor shall take such steps as may be necessary to improve his progress and the Engineer may require him to increase the number of shifts and/or overtime operations, days of work, size of forces and/or the amount of construction plant. All such action taken by the contractor pursuant to the direction of the Engineer shall be without additional cost to the department.

Failure of the contractor to meet his obligations set-forth in the paragraph above, under this provision shall be ground for determination by the Engineer that the contractor is not progressing the work with such diligence as will ensure completion within the time specified. Upon such determination, the Engineer shall take necessary steps to increase the labour forces, amount of construction plant etc. as he deems fit to ensure completion of works in accordance with the schedule at the contractor's expense.

The contractor may be allowed to carry out work in shifts with the approval of the Engineer.

It shall be the responsibility of the contractor to mark the actual progress of the works in progress report form at the end of every two weeks, and the calculated progress for the job as a whole, and shall submit to the Engineer.

The contractor shall submit design and construction details for various temporary works and he shall incorporate and modification suggested by the Engineer from time to time which however, shall not relieve him of the responsibility of providing the structure as per drawing / specifications, etc. Notwithstanding the approval by the Engineer to the design submitted by the contractor for any of the temporary works, the contractor shall remain entirely responsible for the safety and soundness of the structure until the complete work is taken over by the Engineer.

The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor and shall be deemed to be of the essence of the contract on the part of the contractor and shall be reckoned from the 15th day of the date on which the work order to commence the work is issued to the contractor and all work shall be completed in accordance with the construction schedule attached to the specifications. Monsoon or inclement weather will not be considered reason for extension of time. The contractor shall submit a time schedule keeping the phasing of the work generally in line with the construction schedule for the approval of the Engineer and such an approved programme shall be strictly adhered to by the contractor.

26.0 NO NIGHT DUTY OR SUNDAY WORK

Subject to any provision to the contrary contained in the contract none of the permanent work shall be carried out during night or on Sunday, if locally recognized as day of rest or their locally recognised equivalent without the permission in writing of the Engineer. When the work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the works in which case the contractor shall immediately advice the Engineer provided always that the provision of this clause shall not be applicable in case of any work which it is customary to carry out by rotary of double shifts. Normal working hours is from 09.00hrs and 17.30 hrs within the DAE Complex, Kalpakkam.

27.0 SEQUENCE OF WORK

The contractor shall execute all the work as per the sequence given by the Engineer from time to time.

28.0 QUALITY CONTROL & TESTING OF MATERIALS AND WORKMANSHIP:

All materials and workmanship shall be of the respective kinds, described in the contract and in accordance with the Engineer's instructions and shall be subject from

time to time to such tests as the Engineer' may direct at the place of manufacture or fabrication or at the site or at all or any of such places. The contractor shall provide such assistance, instruments, machines, labour and materials and shall supply samples of materials as are normally required for examining, measuring and testing all work and the quality, weight or quality of materials before incorporation in the works for testing as may be selected and required by the Engineer. The cost of such tests shall be borne by the contractor.

Only genuine materials of the approved make listed under the preferred make of materials shall be supplied. Before effecting bulk supply, sample of each item shall be submitted for approval of Engineer-in-Charge. If necessary, Engineer-in-Charge or his authorized representative will visit the manufacturer's works for witnessing the tests on the items to be supplied under this Contract to ensure that the items conform to and meet the intent of the specification. The Engineer-in-Charge reserves the right to waive off pre-dispatch inspection of any or all the items covered under this contract at his discretion. It is responsibility of the Contractor to supply items conforming to the tender specifications and also arrange and organise such tests with the manufacturer. The Contractor shall also be responsible to ensure that the items are conforming to the specifications before delivering at site.

Catalogues, Instructions for installation and maintenance - containing part number, specifications, Guarantee/Warranty Certificate supplied by the manufacturer along with Control/Switchgear and other items shall be handed over to the Department as and when the materials are delivered at Site. Removed items/components shall be transported and returned to the Department as directed by the Engineer-in-Charge through proper documentation.

A sample of all components shall be got approved by the Engineer-in-Charge prior to purchasing the item in bulk by the contractor.

All the materials and consumables required for the completion of work except specifically brought out as free issue by the Department, shall be supplied by the Contractor.

CONTRACTORS ARE ADVISED TO PURCHASE THE MATERIALS ONLY FROM THE MANUCTURERS OR THEIR STOCKISTS TO AVOID INFERIOR QUALITY AND THE CONTRACTOR SHALL FURNISH THE INVOICE AND DELIVERYCHALLANWHILE BRINGING MATERIALS FOR THE WORK. THE DOCUMENTS AS WELL THE MATERIALS WILL BE SUBJECTED TO CHECK BEFORE USING THE MATERIAL FOR THE WORK.

All the fabricated items covered by this specification to be supplied by the Contractor/manufacturer shall be offered for Pre-despatch inspection to the Engineer-in-Charge or his authorised representative. Items/Components found unsatisfactory as to workmanship shall be removed by the Contractor and replaced at no extra cost with Items/Components which are satisfactory.

All the Items/Components covered by this specification to be supplied by the Contractor shall be despatched only after obtaining the written Shipping Release from the Engineer-in-Charge. Waiving off pre-despatch inspection or acceptance of the items by the quality surveyor shall not relieve the Contractor/Manufacturer from the responsibility of furnishing the items and workmanship in accordance with this specification. Sample items shall be brought for acceptance of EIC. Upon approval and shipping release, bulk purchase shall be effected by contractor. Delivery Chelan and invoice shall accompany the material failing, which no payment will be made.

The representative of the Engineer-in-Charge shall have at all reasonable times access to the Supplier's or Sub-Supplier's works for the purpose of witnessing the tests and to ascertain that the items being manufactured conforms to the requirements of this specification. The Engineer-in-Charge shall be given at least 10 days advance notice, in general, prior to the commencement of testing so that the representative of the Engineer-in-Charge can plan to visit and witness the tests. All the tests indicated in the test clause of this specification shall be carried out in the presence of the representative of the Engineer-in-Charge by the manufacturer and shall provide all the facilities & equipment for testing. Three copies of the Test Certificate/ Report shall be furnished to the Engineer-in-Charge for approval prior to despatch of items from the works.

The Contractor and Manufacturer of the equipment shall carry out the checks as per the Check List which will be provided by the Engineer-in-Charge on approval of Drawings and confirm the compliance to the Check-List prior to issue of Inspection Call.

29.0 CONTRACTOR'S SUPERINTENDANCE

The contractor shall give or provide all necessary superintendence during the execution of the works and as long thereafter as the Engineer may consider necessary for the proper fulfilling of the contractor's obligations under the contract. The contractor's competent and authorized agent or representative approved in writing by the Engineer (which approval may at any time be withdrawn) is to be constantly on the works and shall give his whole time to the superintendence of the same. If such approval shall be withdrawn by the Engineer, the contractor shall as soon as is practicable (having regard to the requirement of replacing him as hereinafter mentioned) after receiving written notice of such withdrawal, remove the agent from site and shall not therefore employ him again on site in any capacity and shall replace within a period of seven days by another agent approved by the Engineer. Such authorized agent or representative shall receive on behalf of the Contractor directions and instructions from the Engineer.

30.0 INSPECTION

The work shall be conducted under the general direction of the Engineer and is subject to inspection by his appointed Inspectors to ensure strict compliance with the terms of the contract. No failure of the Engineer or his designated representative during the progress of the work to discover or to reject materials or work not in accordance with the requirement of this contract shall be deemed an acceptance thereof, or a waiver of defects therein, and no payment by the Engineer, or partial/entire occupancy of the premises, shall be construed to be an acceptance of work or materials which are not strictly in accordance with the requirements of this contract. No changes whatsoever to any provision of the specifications shall be made without written authorisation from the Engineer.

31.0 MODE OF MEASUREMENT

Mode of measurement will be as specified by the Engineer and the Engineer's decision shall be final and binding on the contractor.

32.0 ASSISTANCEF OR TAKING MEASUREMENTS

The contractor shall provide necessary labour and assistance to the Engineer for checking layout alignments, levels and other survey works connected with the excavation of work and also for taking measurement for finished works at no extra cost to the Government.

33.0 SITE TESTING

Contractor should carry out the tests on different equipment as specified in respective sub sections to be issued, in order to enable the Engineer to determine whether the equipment and works comply with the intent and requirement of specifications under test and normal working conditions. The contractor should arrange his own testing equipment required for tests to be carried out at site on any of the equipment.

The testing instruments required conducting site test shall be provided by the contractor. In case, if any departmental equipment or instrument is issued and it suffers from damage or loss of components the same will be procured by the Contractor and made good, failing which the department will carry out the repair / replacement and recovery will be effected towards the cost of repair/ replacement from the Contractor's RA/Final bill.

34.0 PLAN O FOPERATION AND CO-ORDINATION

The contractor for work under the contract shall be required to co-ordinate with work of other contractors performing work at the site and also in the same area. So far as practicable all contractors shall have equal rights to use all roads, ground and facilities made available for the joint use of the contractors. In case of disagreement regarding such use the decision of the Engineer shall govern.

The contractor shall in accordance with the requirements of the Engineer afford all reasonable opportunities for carrying out the work to any other contractors employed by the Engineer or to the Engineer himself and of any other duly constituted authorities who may be employed in the execution on or near the site of any work not included in the contract of any contractor which the Engineer may enter into in connection with and/or ancillary to the works. The Government will not entertain any claims from the Contractor for delay on account of lack of coordination with one another and also the contractor whose work is delayed due to lack of coordination from any other contractor can claim damages from the delaying contractor if the same is duly certified by the Engineer.

It is envisaged that other works such as installation of sanitary, water supply and electrical arrangements, equipment, piping and other works not covered in this contract may have to be carried out by the other agencies in the completed/partially completed portion of the building along with this work. The tenderer shall permit such works to be carried out without any hindrance and fully co-ordinate his activities with other agencies. No compensation or claim for such contingencies shall be entertained.

35.0 DETAILS OF CONTRACTOR'S EMPLOYEES

It is to be ensured by the contractor that the correct personnel particulars and addresses of the employees and workers employed by the contractor and sub-contractors are available with them. The same shall be submitted to the department.

36.0 EMERGENCY PREPAREDNESS

It may be noted that the Government as a part of the emergency preparedness for any eventual site emergency civil defence which/would require the entire or part of the contractors personnel and labour to be evacuated from the site without any advance notice as and when deemed necessary. This may result in temporary stoppages of work with possible loss of time and productivity not likely to exceed 1 day. This aspect shall be taken into account while quoting their rates and the department will not entertain any claim/compensation on this account. However, the department may grant suitable extension of time only.

37.0 ENTRY TIMING FOR TRUCKS

All the trucks transporting materials for the works should have valid permit for running inside DAE Complex, Kalpakkam. The materials have to be transported only during 09.00 hrs and 18.00 hrs within the DAE Complex, Kalpakkam.

38.0 SCHEDULE OF QUANTITIES

The schedule of quantities is to be read in conjunction with this special conditions,

general conditions of contract, specifications, drawings and schedule of supply of materials detailing materials to be supplied by the Department.

The quantities stated are to be considered approximate only and the unit prices entered in the schedule of quantities shall apply to the actual quantities in the completed work, up to a deviation of25%onthe contract value of the work.

Each tender should contain not only the rates but also the value of each item of work entered in a separate column and all the items should be totalled up in order to show the aggregate value of the entire tender. In case of manual tenders, all corrections in the tender schedule shall be duly attested by the dated initials of the tenderer. Corrections which are not attested may entail the rejection of the tender. The tender document should be signed and returned without, detaching any part of the document.

39.0 RATES

Rates quoted shall include labour, materials, tools, plant, appliances, transport, shipment, GST, other taxes levied by Government, duties, levies, water and power supply, metering and consumption charges, temporary plumbing, cost of storage sheds for materials, contractor's supervisions, overheads and profit, general risks or liabilities and all that the necessary for the satisfactory completion of the job. The rates shall be firm and shall not be subject to the exchange variations, labour conditions or any conditions whatsoever other than what is provided in the contract.

All quarry fees, royalties and other taxes on materials brought by the contractor to the site, such as stone, sand and other materials will be paid for by the contractor directly. If refunds of such payments are, however, admissible under the rules made by local authorities, the contractor may obtain such refund by following prescribed procedure laid down by concerned authorities. Assistance of the Engineer will be limited to the extent of issuing certificate stating that the materials so imported have become the property of the Government. The contractor shall take into account this fact while quoting his rates in the tender. If the quarry falls in private land or Government land leased to private parties, the Contractor will have to obtain the permission of such private parties and shall pay the royalties and other charged to them.

No foreign exchange will be made available by the Government for any other equipment covered in the tender specifications. However, where it is unavoidable, imported items can be included. The tender should clearly indicate materials, quantity, rate and amount of such imported items and also the country from which it is proposed to import the materials.

40.0 TENDER RATES INCLUSIVE OF WORKS CONTRACT TAX-*Deleted*

41.0 CONDITIONAL TENDER WITH CONDITIONAL REBATE SHALL BE SUMMARILY REJECTED

Tenders, which propose any alteration in the work specified in the said form of invitation to tender or in the time allowed for carrying out the work, or which contain any other condition of any sort including conditional rebate will be summarily rejected.

42.0 RIGHTS OF GOVERNMENT

The competent authority on behalf of the President of India does not bind himself to accept the lowest or any other tender, and reserves to himself the authority to reject any or all of the tenders received without assignment of a reason. All tenders, in which any of the prescribed conditions is not fulfilled or any condition including that of conditional and / or unconditional rebate is put forth by the tenderer shall be summarily rejected.

The Engineer reserves the right to place order for all items and services as envisaged in the scope of work or for a part thereof at his discretion and reserves the right to accept or reject the lowest or any other tender without assigning any reason for the same.

43.0 WITHDRAWAL OF TENDER

If any tenderer withdraws his tender within the validity period or makes any modification in the terms and conditions of the tender which are not acceptable to the Department, then the Government shall without prejudice to any other right or remedy be at liberty, to forfeit 50% (fifty percent) of the earnest money absolutely and suspend the tenderer for one year and shall not be eligible for IGCAR tenders from the date of issue of suspension order.

If the contractor fails to furnish the prescribed performance guarantee within the prescribed period, the earnest money is absolutely forfeited to the President.

44.0 INSURANCE

The contractor shall note that the work has to be carried out in a coastal area. The contractor shall take necessary precautions to ensure safety of the staff, materials, equipment and the works during the period of contract. No claim from the contractor for loss of or damage of equipment, materials, staff or the works during the course of

the work due to natural causes like cyclones, tsunami, gales, floods, rains or other cause or combination of causes will be entertained by the Department. The Contractor shall be fully liable to compensate the Government for any loss or damage in works till the actual date of completion of the work. Immediately on award of the contract, the contractor shall take a contractor's All Risk Insurance Policy with an insurer acceptable to the Government to the value of sum assured equal to the work order value wherein the Government shall be named as "co-assured". The validity of insurance policy shall be up to the actual date of completion of the work. However such insurance shall not in any way limits or diminishes the responsibility of the contractor for loss or damage.

The Insurance Policy shall be produced by the Contractorwithin15 days from the date of issue of Letter of Intent.

The contractor shall be fully responsible for the safe guard of the Departmental free issue equipments and materials issued to them against all risks. If the free issue materials are to be taken out of DAE complex for execution of the work, then the contractor shall take out an additional insurance policy against all risk to the value of sum assured equal to the value of free issue materials taken out of DAE complex as assessed by the EIC. The validity of such insurance policy shall be up to the actual date of completion of the work.

Insurance for the contractor's workman shall be taken by the contractor to safeguard their life risk of their working force as per relevant rules and the same shall be verified by the Engineer in-charge.

45. LAYOUTANDSTAKINGOUTBASELINESANDLEVELS:

The contractor shall layout his work from base lines and grades established by the Department, and shall be responsible for all measurements in connection therewith. The contractor shall, at his own expense furnish all stakes, templates, platforms, equipments, ranges and labour that may be required in setting and cutting or laying out any part of the work. The contractor shall be held responsible for the proper execution of the work to such lines and grades as may be established or indicated on the drawings and specifications. The contractor shall take benchmarks, lines and levels. The contractor is to construct and maintain proper benches at the intersections of all main walls, columns, etc. in order that the lines and levels may be accurately checked at all times, the odolite, levels, prismatic compass, chain, steel and metallic tapes and all other surveying instruments found necessary for the work shall be provided by the contractors for use at site in connection with this work.

46. SUPPLYOFMATERIALS:

Thematerialstobesuppliedbythedepartmentandtheirissueratesaregiven in schedule of supply of materials and the contractors have to make their own

arrangements for the carriage of the same from departmental stores to the work site. While every attempt will be made to supply sizes as detailed in the drawings other suitable sections may be offered to suit the design. No extra payment would be admissible for the use of alternative sections. Materials not covered by the Schedule of supply of materials and available for issue which the Department may be supplied at the discretion of the Engineer at rates to be fixed by him and inclusive of storage and supervision charges.

47. SUBSTITUTE OF MATERIALS:

a) In any section of these specifications where items of material or equipment are specified by brand name, catalogue number or by name of manufacturers the reference is intended to be descriptive and got restrictive and is solely for the purpose of indicating type or quality of item that will be acceptable. An approved equal shall be acceptable whether so specifically stated or not at the discretion of Engineer.

b) The engineer reserves the right to have certain tests and/or analysis made of any proposed substitute material or equipment to determine its acceptability for the purpose specified.

i) Samples of the proposed substitute material or equipment certified by the manufacturer, shall be submitted to the Engineer for test and/or analysis. The quantities of the items in question required for these tests and/or analysis shall be determined by Engineer.

ii) During the progress of the work, the Engineer may, be take samples of the substitute item for analysis.

iii) All costs of the tests, check tests and/or analysis made shall be borne by the contractor, except that where more than two check tests, are requested that the cost of additional tests and/or analysis shall be borne by the department.

iv). No proposed substitute for a specified item shall be used in the work of the contract prior to written authorization by the Engineer, such written authorization to state the amount of the adjustment, if any to be made in favour of the department.

iv) Should the use of authorised substitute materials and/or equipment proposed by the contractor, require, in the opinion of the Engineer changes or modifications in the design, engineering drawing, specifications or work to be performed under the contract in any way, all of the cost of making such changes or modifications, whether or not considered at the time of the substitute was approved shall be borne by the contractor. Said costs shall include, but not be limited to, the

finishing installation by the contractor or any additional materials or equipment which in the opinion of the Engineer may be deemed necessary to accommodate the substitute materials and/or equipment in the work.

48. a) ANY SAMPLES AND DESCRIPTIVE DATA REQUIRED SHALL:

1) Be submitted within the time specified in these specifications or if no time specified, within a reasonable time as determined by the Engineer before use to permit inspection and testing.

2) Be shipped prepaid and delivered as specified in these specifications, or as directed by the Engineer.

3) i) Be properly marked to show the name of the materials trade name or manufacturer, place of origin name and location of the work where the materials represented by the sample is to be used, and the name of the contractor submitting the sample.

ii) Failure of any sample to pass the specified requirements for a particular use will be sufficient cause for refusal to consider further for the same use any sample from the same manufacturer whose materials failed to pass the tests.

49. Deleted

50. PLAN OF OPERATION & CO-OPERATION:

The contractor for work under the contract shall be required to co-ordinate his work with that of other contractors performing work at the site and also in the same area. So far as practicable all contractor shall have equal rights to use all roads, ground and facilities made available for the joint use of the contractors. In case of disagreement regarding such use, the decision of the Engineer shall govern. The contractor shall afford all facilities and give complete co-operation for the execution of various other works, if required to be carried out simultaneously by other agencies while his own work is in progress. The co-ordination will be effected in consultation with the Engineer-in-Charge of the work. Other contractors are also likely to be authorized by the Department to work in the same area during the construction stage for work such as (i) Electrical (ii) Air-conditioning (iii) Services and (iv) Public Health and other miscellaneous works.

The contractor shall afford all facilities

a) For the installation of embedded parts, sleeves with its accessories in slabs, beams or walls by the other agencies, before the reinforcement is placed. Necessary outlets in the Shuttering will have to be provided by the civil contractor for this purpose for which no extra payment will be admissible.

b) For the installation of various service lines in the walls, floors, slabs ducts etc.

c) The contractor shall afford all facilities for using scaffolding etc. by the other contractors.

No extra claims on account of facilities provided for carrying out the work mentioned above will be entertained.

It is envisaged that other works such as installation of sanitary, water supply and electrical arrangements, equipment, piping and other works not covered in this contract may have to be carried out by the other agencies in the completed/partial completed portion of the building along with this work. The tenderer shall permit such works to be carried out without any hindrance and fully co-ordinate his activities with other agencies. No compensation or claim for such contingencies shall be entertained.

51. GOVERNMENT LABOUR LAWS:

The contractor has to follow strictly the Government labour acts which are in force at present and all necessary facilities and arrangements for labour will have to be made by the contractor.

52. EARNEST MONEY DEPOSIT:

The amount of the earnest money, which a contractor should deposit with the tender, is regulated by the following scales. In case of petty works costing Rs.5,000/- or less the Executive Engineer may, at his discretion, dispense with the condition for calling for earnest money.

(i) For works estimated to cost upto Rs.10.00 Crores 2% (Two percent) of the estimated cost.

(ii) For works estimated to cost more than Rs.10.00 Crores Rs.20.00 lakhs plus1% (Onepercent)oftheestimatedcostinexcessofoverRs.10.00Crores.Theearnest money may be accepted in the following forms:

(iii) Deposit at call receipt of a scheduled bank guaranteed by the Reserve Bank of India.

(iv) Banker’s Cheque.

(v) Demand draft.

(vi) FDR.

It should be ensured that the FDR is valid for a period of six months or more after last date of receipt of tenders and that it is pledged in favour of P&AO, IGCAR, Kalpakkam.

If the banks are closed on the day of opening of tenders the date of opening of tender shall be postponed suitably.

53. SECURITY DEPOSIT:

A sum @ 2.5% of the gross amount of the bill shall be deducted from each running bill of the contractor till sum will amount to security deposit of 2.5% of the tendered value of the work. In addition the contractor shall be required to deposit an amount equal to 3% of the tendered value of the contract as performance security within the period prescribed for commencement of work in letter of award issued to him. However, security deposit may be released against bank guarantee issued by a scheduled bank of its accumulation to a minimum amount of Rs.5 lakhs subject to the condition that amount of any bank guarantee except last one, shall not be less than Rs.5 lakhs.

54. SUB CONTRACTORS:

The contractor shall within fifteen days, after the date of award of this contract notify the Engineer in writing of the names of all subcontractors proposed for the work and the extent and character of the work to be done by each. If, for sufficient reason, at any time during the progress of the work, the Engineer determines that any sub-contractor is incompetent or undesirable, who will notify the contractor accordingly and the contractor shall take steps immediately to cancel such sub-contract. Subletting by contractors shall be subject to the same regulations. Nothing contained in this contract shall create any contractual relations between any subcontractor and the department.

55. RETURN OF CONTAINERS:

The contractor shall sell and serviceable empty cement bags except those which are used on bonafide works as approved by the Engineer, to the authorized bag collecting agents of cement suppliers at the rates fixed from time to time by the DGS&D and produce evidence to that effect to the Engineer. For every empty cement bag not so returned, he will be levied a penalty of Rs.1/- (Rupee one only) per bag. The paper bags need not be returned.

Containers of all other materials listed in schedule of supply of materials of this document issued to the contractor shall be returned unless otherwise stated elsewhere in good condition to the Government stores and in any case of dispute, the decision of the Engineer will be final.

56. TEMPORARY BUILDINGS:

Warehouse, shed, workshop and office facilities as required by the contractor shall be provided by him at his own expenses. Prior approval of the Engineer-in-charge shall be obtained in respect of location layout and details, of these buildings. After the work is over these temporary facilities shall be removed by the contractor at his own expenses to the satisfaction of the Engineer-in-charge within 10 days from the date of completion. No land for erecting temporary huts for housing the contractors Labourers will be made available by the Department. The contractor will have to make his own arrangements for the same.

57. PAST EXPERIENCES:

Contractors shall submit / upload along with the tender details of their past experience in execution of large works, including value of each work and name of clients, place of execution and other relevant information. .

58. RUBBLE STONE AND AGGREGATES:

The contractor shall select good quality of rock approved by the Engineers for the purpose of producing aggregates and rubble stone for construction work. Any machine crushed graded stone aggregate conforming to IS will be permitted for all concrete works. It is the responsibility of the tenderer to obtain good quality material to the satisfaction of the Engineer. If the quality of rock is not up to the required standard from one quarry, the tenderer will have to obtain the rock from other sources. The tenderer is not entitled for any extra payment on account of extra lead if any involved.

59. Works Contract Tax–DELETED

60. DEDUCTION OF INCOMETAX:

As per Section 194 (C) of Income Tax Act, as amended by letter No. 275/9£, 72/9- TJ (Circular No.86) dated 19-5-1972 received from Ministry of Finance (Department of Revenue and Insurance), New Delhi, the Income Tax @ 2%(two percent only) on the gross value of the work done will be recovered from the bills. Additionally 1% (One percent only) each towards SGST and CGST as applicable on the gross value of the work done (excluding GST) will be recovered from the bills. A certificate for the amount so recovered will be issued by the Department to the contractor.

61. LISTOFWORKSCARRIEDOUTBYTENDERERS:

The tenderer shall also submit along with a tender “a list of works” and also the appropriate cost of each work carried out by him in the past for different Government

Department or Public bodies.

62. DEPARTMENT NOT LIABLE FOR DAMAGES TO PLANT ETC.:

a. The Department shall not be liable at any time for the loss of materials / damage to any of the construction plant / temporary work materials.

b. If any plant or equipment or machinery purchased out of advances taken from the Department, such plant, equipment or machinery shall have to be issue by the contractor at least to the extent of such advance and pledged in the name of the Department until all such advances shall have been paid to the Department.

63. URGENT REPAIRS:

If by reason of any accident or failure or other event occurring to, in connection with the works or any part there of either during the period of maintenance any remedial or other work on repair shall in the opinion of the Engineer-in-Charge be urgently necessary for security and the contractor is unable or unwilling, Engineer-in-charge at once to do his own or other workmen to such work or repair as may consider necessary. If the work or repair so done is work which in the opinion of the Engineer-in-charge, the contractor was liable to do at his own expenses under the contract, all the costs and charge properly incurred by the Engineer-in-charge in doing so, shall on demand, be paid by contractor or may be deducted from any moneys due to which may become due to the Contractor provided always that the Engineer-in-charge shall be soon after the occurrence of any such emergency as may be reasonably practicable notify the contractor thereof in writing.

64. GOVERNMENT LABOURACTS/LAWS:

The contractor has to follow strictly the Government Labour Acts, which are in force at present and introduced from time to time, such as, Acts enforced by Regional Provident Fund Commissioner. Directorate of ESIS and Enforcement Officer of Contract Labour Act, and all necessary arrangement for labour, security insurance will have to be made by the Contactor at his own cost.

65. PAYMENT TERMS:

Terms of payment are as follows:

i. Secured advance will be payable as per clause10B(i)of section IV. However the same will not be payable for perishable / fragile / combustible materials.

On completion of installation, testing and commissioning 100% of work order rate

(Supply + Installation)will be released on pro rata basis.

66. ADHERENCE TO TIME SCHEDULE

The Offer shall be accompanied by a detailed bar chart indicating the various activities viz. placement of order for procurement of materials, delivery time, time required for completion of each item/activity, other than the periodical construction activities to ensure that the work will be completed in the stipulated time.

The Contractor shall plan various activities to ensure strict adherence to the construction schedule and as per the priorities to be decided by the Engineer-in-Charge.

Site Engineer/Supervisor of the Contractor shall meet the Engineer-in-Charge on all working days and finalise the work to be executed on each day with the approval of the Engineer-in-Charge. He shall be present at the work spot during the working hours.

The Contractor will finalize the work programme well in advance in consultation with the Engineer-in-Charge. Details of Cables laid every day shall be submitted to the Engineer-in-Charge, in the approved format positively the next working day.

The Contractor shall note that no construction activity will normally be allowed at Site on Sundays and all Government Holidays. However, if required by the Engineer-in-Charge, to expedite the completion of specific work, as it may arise from time to time, special permission shall be obtained to work on such days at the discretion of the Engineer-in-Charge.

Guaranteed Technical Particulars, Data Sheets, and Drawings, etc. for various equipment/materials shall be submitted for the approval of the Engineer-in-Charge well in advance. Copy of the Purchase Orders placed for various equipment/materials shall be submitted to the Engineer-in-Charge for his reference and records as and when sought for.

67. DEVIATION from tender specification:

Deviations contemplated by the Tenderer, if any, from these specifications shall be spelt out clause wise, clearly in the offer.

If deviations are not clearly brought out/mentioned it will be deemed that the offer is fully complying with the tender specification.

68. Packing, Delivery and Unloading

It shall be the contractor’s responsibility to transport all equipment and materials to the job site at his own expenses. Contractor shall prepare the equipment covered in

this specification for transport in such a manner so as to protect it from damage in transit & ingress of water and shall be responsible to make good at his own expense any and all damage due to improper packing. The contents shall be identified on the package. The packing shall be marked with lifting & hook-up points for unloading.

The Contractor shall make his own arrangements for the transportation, unloading and safe storage of materials at Site.

The contractor shall use only established roadways for transport and use such temporary roadways or necessary approval by the Engineer. When it is necessary to cross kerbs or sidewalks protection against damage shall be provided by the contractor. Any damage caused to roads, kerbs, sidewalks, or other load bearing facilities shall be repaired by the contractor at his own expenses.

69. COMPLETION CERTIFICAT AND MAINTENANCE GUARANTEE

After the completion of the installation and testing, the contractor should furnish a certificate in the proforma provided by the Department at the time of taking over the installation. The installation shall be guaranteed for a period of 12 months from the date of completion of contract. During the period of guarantee all defects in material or in workmanship, shall be rectified or replaced free of cost to the Department. The contractor shall give guarantee certificate upon completion of contract.

All the LED

fixtures shall be painted with order no and date of energizing as directed by EIC. The contractor shall submit guaranty certificate from OEM for 5 years from date of supply. The contractor shall also give an undertaking for repair / replacement of LED light fixtures in case of failure of the same within 5 years from the date of supply.

SECTION IV

CONDITIONS OF CONTRACT

DEFINITIONS :

1. The '**Contract'** means the documents forming the tender and acceptance thereof and the formal agreement executed between the President of India and the Contractor together with the documents referred to therein including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Engineer and all these documents taken together shall be deemed to form one contract and shall be complementary to one another.

2. In the contract the following expressions shall unless the context otherwise requires have the meanings hereby respectively assigned to them.

   a. The expression 'Works' or 'Work' shall unless there be something either in the subject or context repugnant to such construction, be construed and taken to means the works by or by virtue of the contract contracted to be executed whether temporary or permanent and whether original, altered, substituted or additional.

   b. The 'Site' shall mean the land and/or other places on, into or through which work is to be executed under the contract or any adjacent land, path or street through which work is to be executed under the contract or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract.

   c. The 'Contractor' shall mean the individual or firm or company whether incorporated or not undertaking the works and shall include the legal personnel representative or such individual or the persons composing such firm or company or the successors of such firm or company and the permitted assignees of such individual or firm or firms or company.

   d. The 'President' means the President of India and his successors.

   e. The 'Superintending Engineer' means the Superintending Engineer or the Director of MC&MFCG Group, Indira Gandhi Centre for Atomic Research, Kalpakkam. The 'Engineer-in-Charge' means the authorized representative of Superintending Engineer or, Head as the case may be of the Pyro Process Engineering Division, MC&MFCG Group, Indira Gandhi Centre for Atomic Research, Kalpakkam who shall supervise and be in-charge of the work and who shall sign the contract on behalf of the President.

   f. 'Government' or 'Government of India' shall mean the President of India.

   g. The term S.E. represents Superintending Engineer, of the MC&MFCG Group, Indira Gandhi Centre for Atomic Research, Kalpakkam.

h. Market Rate shall be the rate as decided by the Engineer-in-Charge on the basis of the cost of materials and labour at the site where the work is to be executed plus the percentage to cover all overheads and profits.

i. 'Contract Price' means the sum named in the Tender subject to such additions there to or deductions there from as may be made under the provisions herein before contained.

j. 'Temporary Work' means all temporary works of every kind required in or about the execution, completion and maintenance of the works.

k. Words imparting the singular number includes the plural number and vice versa according to the context.

l. 'Tendered Value' means the value of the entire work as stipulated in the letter of award.

3. Where the context so requires, words imparting the singular only also include the plural and vice versa. Any reference to masculine gender shall whenever required include feminine gender and vice versa.

4. Headings and Marginal notes to these General Conditions of Contract shall not be deemed to form part thereof or be taken into consideration in the interpretation or construction thereof or of the contract.

5. The contractor shall be furnished, free of cost one certified copy of the contract documents except standard specifications, Schedule of Quantities and such other printed and published documents, together with all drawings as may be forming part of the tender papers. None of these documents shall be used for any purpose other than that of this contract.

6. The work to be carried out under the contract shall, except as otherwise provided in these conditions, include all labour, materials, tools, plants, equipment and transport which may be required in preparation of and for and in the full and entire execution and completion of the works. The descriptions given in the schedule of Quantities shall, unless otherwise stated, be held to include wastage on materials, carriage and cartage, carrying and return of empties, hoisting, setting, fitting and fixing in position and all other labours necessary in and for the full and entire execution and completion of the work as aforesaid in accordance with good practice and recognized principles.

7. The contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and prices quoted in the Schedule of Quantities, which rates and prices shall, except as otherwise provided, cover all his obligations under the Contract and all matters and things necessary for the proper completion and maintenance of the works.

8. The several documents forming the Contract are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small scale drawing and figured dimensions in preference to scale and special conditions in preference to General Conditions.

8.1 In the case of discrepancy between the schedule of quantities, the Specifications and/or the Drawings, the following order of preference shall be observed.

i) Description of Schedule of Quantities.

ii) Particular Specification and Special Condition, if any.

iii) Drawings.

iv) Specifications.

v) Indian Standard Specifications of B.I.S.

8.2 If there are varying or conflicting provisions made in any one document forming part of the contract, the Accepting Authority shall be the deciding authority with regard to the intention of the document and his decision shall be final and binding on the contractor.

8.3 Any error in description, quantity or rate in Schedule of Quantities or any omission there from shall not vitiate the Contract or release the Contractor from the execution of the whole or any part of the works comprised therein according to drawings and specifications or from any of his obligations under the contract.

9) The successful tenderer/contractor, on acceptance of his tender by the Accepting Authority shall, within 15 days from the stipulated date of start of work sign the contract consisting of:-

i) The notice inviting tender, all the documents including drawings, if any, forming the tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto.

ii) Standard form as mentioned in Tender consisting of:

a) Various standard clauses with corrections up to the date along with annexure thereto.

b) Specification for various items of work.

c) IGCAR safety code for contract works. (Annexure I)

d) Model Rules for the protection of health, sanitary arrangements for workers employed by IGCAR or its contractors. (Annexure II)

e) DAE contractor's Labour Regulations. (Annexure III & IV)

CONDITIONS OF CONTRACT

CLAUSE 1 : PERFORMANCE GUARANTEE:

i) The contractor shall submit an irrevocable Performance Guarantee of 5% (Five percent) of the **tendered amount** in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement, (not withstanding and/or without prejudice to any other provisions in the contract) within

period specified in Schedule 'F' from the date of issue of letter of acceptance. This period can be further extended by the Engineer-in-charge upto a maximum period as specified in Schedule 'F' on written request of the contractor stating the reason for delays in procuring the Performance Guarantee, to the satisfaction of the Engineer-in-charge. This guarantee shall be in the form of Government Securities or fixed deposit receipts or Guarantee Bonds of any Scheduled Bank/Banker's cheque of any scheduled bank/ or the State Bank of India in accordance with the form annexed as Appendix-'A' hereto. In case a fixed deposit receipt of any Bank is furnished by the contractor to the Government as part of the performance guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the Government to make good the deficit.

ii) The Performance Guarantee shall be initially valid upto the stipulated date of completion plus 60 days beyond that. In case the time for completion of work gets enlarged, the contractor shall get the validity of performance Guarantee extended to cover such enlarged time for completion of work. After recording of the completion certificate for the work by the competent authority, the performance guarantee shall be returned to the contractor, without any interest.

iii) The Engineer-in-charge shall not make a claim under the Performance guarantee except for amounts to which the President of India is entitled under the contract (notwithstanding and/or without prejudice to any other provisions in the contract agreement) in the event of :

a) Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer-in-charge may claim the full amount of the Performance guarantee.

b) Failure by the contractor to pay President of India any amount due, either as agreed by contractor or determined under any of the Clauses/Conditions of the agreement, within 30 days of the service of notice to this effect by Engineer-in charge.

iv) In the event of the contract being determined or rescinded under provisions of any of the clause /condition of the agreement, the performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of the President of India.

(C)APPENDIX – 'A'

FORM OF PERFORMANCE SECURITY BANK GUARANTEE BOND

In consideration of the President of India (hereinafter called "The Government") having agreed under the terms and conditions of agreement No.....Dated.....made between.....and..... (hereinafter called "the said contractor(s)".....For the work .....

(hereinafter called "the said agreement") having agreed to production of a irrevocable Bank Guarantee for Rs..... (Rupees.....only) as a security / guarantee from the contractor(s) for compliance of his obligations in accordance with the terms and conditions in the said agreement.

1. We (indicate the name of the bank)..... (hereinafter referred to as the "the Bank") hereby undertake to pay to the Government an amount not exceeding Rs..... only on demand by the Government.

2. We (indicate the name of the bank)- do hereby under take to pay the amounts due and payable under this Guarantee without any demure, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said contractor(s). Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs..... (Rupees.....only).

3. We, the said bank further undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor(s) shall have no claims against us for making such payment.

4. We..... (Name of Bank)..... further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Engineer-in-Charge on behalf of the Government certifies that terms and conditions of the said agreement have been fully and properly carried out by the said contractor(s) and accordingly discharges this Guarantee.

5. We..... (Name of Bank).....further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time

to time any of the powers exercisable by the Government against the said contractor(s) and forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said contractor(s) or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This Guarantee will not be discharged due to the change in the constitution of the Bank or the contractor(s).

7. We.....(Name of Bank)…….lastly undertake not to revoke this Guarantee except with the previous consent of the Government in writing.

8. This Guarantee shall be valid up to ..... unless extended on demand by Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs..... (Rupees……only) and unless a claim in writing is lodged with us within six months of date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharged.

Dated the ……. day of ……. for…….....
(Indicate the name of the Bank)

CLAUSE 1-A: RECOVERY OF SECURITY DEPOSIT:

The person/ persons whose tender(s) may be accepted (hereinafter called the contractor) shall permit Government at the time of making any payment to him for work done under the contract to deduct a sum at the rate **of 2.5%**of the gross amount of each running bill till the sum will amount to security deposit of **2.5% of the tendered** value of the work. Such deductions will be made and held by Government by way of Security Deposit unless he has / they have deposited the amount of Security at the rate mentioned above in cash or in the form of Government Securities or Fixed Deposit Receipts. In case a fixed deposit receipt of any bank is furnished by the contractor to the Government as part of the security deposit and the bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the Government to make good the deficit.

All compensation or the other sums of money payable by the contractor under the terms of this contract may be deducted from, or paid by the sale of a sufficient part of his security deposit or from the interest arising there from, or from any sums which may be due to or may become due to the contractor by Government on any account whatsoever and in the event of his Security Deposit being reduced by reason of any such deductions or sale as aforesaid, the contractor shall within 10 days make good in cash or fixed deposit receipt tendered by the State Bank of India or by scheduled banks or Government Securities (if deposited for more than 12 months) endorsed in favour of the Pay & Accounts Officer, IGCAR, any sum or sums which may have been deducted from, or raised by sale of his security deposit or any part

thereof. The security deposit shall be collected from the running bills of the contractor at the rates mentioned above and the Earnest Money if deposited in cash at the time of tenders will be treated a part of the Security Deposit.

The security deposit as deducted above can be released against bank guarantee issued by a scheduled bank, on its accumulations to a minimum of Rs.5 lakhs subject to the condition that amount of such bank guarantee, except last one, shall not be less than 5 lakhs.

NOTE 1 : Government papers tendered as security will be taken at 5% (five per cent) below its market price or at its face value, whichever is less. The market price of Government papers would be ascertained by the Engineer-in-charge at the time of collection of interest and the amount of interest to the extent of deficiency in value of the Government paper will be withheld if necessary.

NOTE 2 : Government Securities will include all forms of securities mentioned in Rule No. 274 of the G.F. Rules except fidelity bond. This will be subject to the observance of the condition mentioned under the rule against each form of security.

NOTE 3 : Note 1 & 2 above shall be applicable for both Clauses 1& 1A

CLAUSE 2 : COMPENSATION FOR DELAY

If the contractor fails to maintain the required progress in terms of Clause 5 or to complete the work and clear the site on or before the contract or extended date of completion, he shall, without prejudice to any other right or remedy available under the law to the Government on account of such breach pay as agreed compensation the amount calculated at the rates stipulated below as the authority specified in Schedule F (whose decision in writing shall be final and binding) may decide on the amount of tendered value of the work for every completed day/month (as applicable) that the progress remains below that specified in Clause 5 or that the work remains incomplete.

This will also apply to items or group of items for which a separate period of completion has been specified.

i) Compensation for delay of work - @1.5% per month of delay to be computed on per day basis.

Provided always that the total amount of compensation for delay to be paid under this Condition shall not exceed 10% of the Tendered Value of work or of the Tendered Value of the item or group of items of work for which a separate period of completion is originally given.

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 Government. In case, the contractor does not achieve a particular mentioned milestone in schedule F, or the re-scheduled milestone (s) in terms of Clause 5.4, the amount shown against that milestone shall be with held, to be adjusted against the compensation levied at the final grant of Extension of Time. Withholding of this amount on failure to achieve a milestone, shall be automatic without any notice to the contractor. However, if the contractor catches up with the progress of work on the subsequent milestone(s)

the withheld amount shall be released. In case the contractor fails to make up for the delay in subsequent milestone(s) amount mentioned against each milestone missed subsequently also shall be withheld. However, no interest, whatsoever shall be payable on such withheld amount.

CLAUSE 2A : INCENTIVE FOR EARLY COMPLETION

In case the contractor completes the work ahead of scheduled completion time, a bonus @ 1% (one percent) of the tendered value per month computed on per day basis, shall be payable to the contractor, subject to a maximum limit of 5% (five percent) of the tendered value. The amount of bonus, if payable, shall be paid along with final bill after completion of work. Provided always that provision of the Clause 2A shall be applicable only when so provided in "Schedule F".

CLAUSE 3 : DETERMINATION OF CONTRACT: POWERS OF ENGINEERS-IN-CHARGE:

Subject to other provisions contained in this clause, the Engineer-in-Charge may, without prejudice to his any other right or remedy against the contractor in respect of any delay, inferior workmanship, otherwise or to any claim for damage and / or any other provisions of this contract or otherwise and whether the date for completion has or has not elapsed, by notice in writing absolutely determine the contract in any of the following cases:

i) If the contractor having been given by the Engineer-in-Charge a notice in writing to rectify, reconstruct or replace any defective work or that the work is being performed in an inefficient or otherwise improper or un skilled like manner shall omit to comply with the requirements of such notice for a period of seven days thereafter.

ii) If the contractor has, without reasonable cause, suspended the progress of the work or has failed to proceed with the work with due diligence so that in the opinion of the Engineer-in-Charge (which shall be final and binding) he will be unable to secure completion and continues to do so after a notice in writing of seven days from the Engineer-in-charge.

iii) If the contractor fails to complete the work with in the stipulated date or items of work with individual date of completion, if any stipulated, on or before such date(s) of completion and does not complete them within the period specified in a notice given in writing in that behalf by the Engineer-in- Charge.

iv) If the contractor persistently neglects to carry out his obligations under the contract and/ or commits default in complying with any of the terms and conditions of the contract and does not remedy it or take effective steps to remedy it with in 7 days after a notice in writing is given to him in that behalf by the Engineer-in- Charge.

v) If the contractor shall offer or give or agree to give to any person in Government service or to any other person on his behalf any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or for borne to do any act in relation to the obtaining or execution of this or any other contract for Government;

vi) If the contractor shall enter into a contract with government in connection with which commission has been paid or agreed to be paid by him or to his knowledge, unless the particulars of any such commission and the terms of payment thereof have been previously disclosed in writing to the Engineer-in-charge;

vii) If the contractor shall obtain a contract with government as a result of wrong tendering or other non-bonafide methods of competitive tendering; or

viii) If the contractor being individual, or if a firm, any partner thereof shall at any time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation or composition (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) Under any insolvency Act for the time being in force or make any conveyances or assignment of his effects or composition or arrangement for the benefit of his creditors or purport so to do or if any application be made under any Insolvency Act for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit of his creditors.

ix) If the contractor being a company shall pass a resolution or the court shall make an order that the company shall be wound up or if a receiver or a manager on behalf of a creditor shall be appointed or if circumstances shall arise which entitle the court or the creditor to appoint a receiver or a manager or which entitle the court to make a winding up order.

x) If the contract shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days.

xi) If the contractor assigns, transfers, sublets (Engagement of labour on a piece work basis or of labour with materials not to be incorporated in the work, shall not be deemed to be subletting) or otherwise parts with or attempts to assign, transfer, sublet or otherwise parts with the entire works or any portion thereof without the prior written approval of the Engineer-in-charge.

xii) If the work is not started by the contractor within 1/8th of the stipulated time. When the contractor has made himself liable for action under any of the cases aforesaid, the Engineer-in-Charge on behalf of the President of India shall have powers:

a) To determine or rescind the contract as aforesaid (of which termination or rescission notice in writing to the contractor under the hand of the Engineer-in Charge shall be conclusive evidence). Upon such determination or rescission the earnest money deposit, security deposit already recovered and performance guarantee of the contractor shall be liable to be forfeited and shall be absolutely at the disposal of Government.

b) After giving notice to the contractor to measure up the work of the contractor and to take such whole, or the balance or part thereof as shall be un-executed out of his hands and to give it to another contract to complete the work. The contractor, whose work is determined or rescinded as above, shall not be allowed to participate in the tendering process for the balance work.

In the event of above courses being adopted by the Engineer-in Charge the contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of the contract. And in case action is taken under any of the provisions aforesaid, the contractor shall not be entitled to recover or be paid any sum for any work thereof or actually performed under this contract unless and until the Engineer-in-Charge has certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.

CLAUSE 3A : WORK CANNOT BE STARTED EITHER PARTY MAY CLOSE THE CONTRACT

In case the work cannot be started due to reasons not within the control of the contractor within 1/8th of the stipulated time for completion of work, either party may close the contract. In such eventuality, the Earnest Money Deposit and the Performance Guarantee of the contractor shall be refunded, but no payment on account of interest, loss of profit or damages etc. shall be payable at all.

CLAUSE4 : CONTRACTOR LIABLE TO PAY COMPENSATION EVEN IF ACTION NOT TAKEN UNDER CLAUSE3.

Contractor liable to pay compensation even if action not taken under Clause 3, Powers to take possession of or require removal of or sell contractor's plant.

In any case in which any of the powers conferred upon the Engineer-in-Charge by clause 3 there of, shall have become exercisable and the same shall not be exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall not withstanding be exercisable in the event of any future case of default by the contractor and the liability of the contractor for compensation shall remain unaffected. In the event of the Engineer-in-Charge putting in force all or any of the powers vested in him under the preceding clause he may, if he so desires after giving a notice in writing to the contractor, take possession of or (at sole discretion of the Engineer-in-Charge which shall be final and binding on the contractor) use as on hire (the amount of the hire money being also in the final determination of the Engineer-in-Charge) all or any tools, plant, materials and stores, in or upon the works, or the site thereof, belonging to the contractor, or procured by the contractor and intended to be used for the execution of the work or any part thereof, paying or allowing for the same in account at the contract rates, or, in the case of these not being applicable, at current market rates to be certified by the Engineer-in-Charge whose certificate thereof shall be final and binding on the contractor, otherwise the Engineer-in-Charge by notice in writing may order the contractor, or his clerk of the works, foreman or other authorised agent to remove such tools, plant, materials, or stores from the premises (within a time to be specified in such notice); and in the event of the contractor failing to comply with any such requisition, the Engineer-in-Charge may remove them at the contractor's expense or sell them by auction or private sale on account of the contractor and at his risk in all respects and the certificate of the Engineer-in-Charge as to the expense of any such removal and the amount of the proceeds and expense of any such sale shall be final and conclusive against the contractor.

CLAUSE 4A: CLAIM FOR IDLE LABOUR -DELETED

CLAUSE 5 : TIME AND EXTENSION FOR DELAY

The time allowed for execution of the Works as specified in the Schedule "F" or the extended time in accordance with these conditions shall be the essence of the Contract. The execution of the works shall commence from such time period as mentioned in Schedule "F" or from the date of handing over of the site whichever is later. If the Contractor commits default in commencing the execution of the work as aforesaid, Government shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the earnest money & performance guarantee absolutely.

5.1 As soon as possible after the Contract is concluded the Contractor shall submit a Time and Progress Chart for each milestone and get it approved by the Department. The Chart shall be prepared in direct relation to the time stated in the Contract documents for completion of items of the works. It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work and may be amended as necessary by agreement between the Engineer-in-Charge and the Contractor within the limitations of time imposed in the Contract documents, and further to ensure good progress during the execution of the work, the contractor shall in all cases in which the time allowed for any work, exceeds one month (save for special jobs for which a separate programme has been agreed upon) complete the work as per mile stones given Schedule "F".

5.2 If the work(s) be delayed by:

I. force majeure or

II. abnormally bad weather or

III. Serious loss or damage by fire, or

IV. Civil commotion, local commotion of workmen, strike or lockout, affecting any of the trades employed on the work, or

V. delay on the part of other contractors or tradesmen engaged by Engineer-in Charge in executing work not forming part of the Contract, or

VI. Non-availability of stores, which are the responsibility of Government to supply or

VII. Non-availability or break down of tools and plant to be supplied or supplied by Government or

VIII. Any other cause which in the absolute discretion of the Engineer-in charge is beyond the Contractor's control.

Then upon the happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the Engineer-in-Charge but shall nevertheless use constantly his best endeavors to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-Charge to proceed with the works.

5.3 Request for rescheduling of mile stones and extension of time to be eligible for consideration, shall be made by the Contractor in writing within fourteen days of the happening of the event causing delay on the prescribed form. The Contractor may also, if practicable, indicate in such a request the period for which extension is desired.

5.4. In any such case the Engineer-in-charge may give a fair and reasonable extension of time and reschedule the mile stones for completion of work. Such extension shall be communicated to the Contractor by the Engineer in-Charge in writing, within 3 months of the date of receipt of such request. Non application by the contractor for extension of time shall not be a bar for giving a fair and reasonable extension by the Engineer-in-Charge and this shall be binding on the contractor.

CLAUSE 6 : MEASUREMENTS OF THE WORK DONE

Engineer-in-Charge shall, except as otherwise provided, ascertain and determine by measurement the value in accordance with the contract of work done.

All measurement of all items having financial value shall be entered in Measurement Book and/or level field book so that a complete record is obtained of all works performed under the contract.

All measurements and levels shall be taken jointly by the Engineer-in-Charge or his authorized representative and by the contractor or his authorised representative from time to time during the progress of the work and such measurements shall be signed and dated by the Engineer-in-Charge and the contractor or their representatives in token of their acceptance. If the contractor objects to any of the measurements recorded, a note shall be made to that effect with reason and signed by both the parties.

If for any reason the contractor or his authorized representative is not available and the work of recording measurements is suspended by the Engineer-in-Charge or his representative, the Engineer-in-Charge and the Department shall not entertain any claim from contractor for any loss or damages on this account. If the contractor or his authorized representative does not remain present at the time of such measurements after the contractor or his authorized representative has been given a notice in writing three (3) days in advance or fails to countersign or to record objection within a week from the date of the measurement, then such measurements recorded in his absence by the Engineer-in-Charge or his representative shall be deemed to be accepted by the Contractor.

The contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for measurements and recording levels. Except where any general or detailed description of the work expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items which are not covered by specifications, measurements shall be taken in accordance with the relevant standard method of measurement issued by the Bureau of Indian Standards and if for any item no such standard is available then a mutually agreed method shall be followed.

The contractor shall give not less than seven days notice to the Engineer-in-Charge or his authorized representative in-charge of the work before covering up or otherwise placing beyond the reach of measurement any work in order that the same may be measured and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the Engineer-in-Charge or his authorized representative in-charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of measurements without such notice having been given or the Engineer-in-Charge's consent being obtained in writing the same shall be uncovered at the Contractor's expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed. Engineer-in-Charge or his authorized representative may cause either themselves or through another officer of the department to check the measurements recorded jointly or otherwise as aforesaid and all provisions stipulate herein above shall be applicable to such checking of measurements or levels.It is also a term of this contract that recording of measurements of any item of work in the measurement book and/or its payment in the interim, on account or final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.

CLAUSE 6A : COMPUTERIZED MEASUREMENT BOOK:

Engineer-in-charge shall, except as otherwise provided, ascertain and determine by measurement the value of work done in accordance with the contract.

All measurements of all items having financial value shall be entered by the contractor and compiled in the shape of the Computerized Measurement Book having pages of A-4 size as per the format of the department so that a complete record is obtained of all the items of works performed under the contract.

All such measurements and levels recorded by the contractor or his authorized representative from time to time, during the progress of the work, shall be got checked by the contractor from the Engineer-in-charge or his authorized representative as per interval or program fixed in consultation with Engineer-in-charge or his authorized representative. After the necessary corrections made by the Engineer-in-charge, the measurement sheets shall be returned to the contractor for incorporating the corrections and for resubmission to the Engineer-in-charge for the dated signatures by the Engineer-in-charge and the contractor or their representatives in token of their acceptance.

Whenever bill is due for payment, the contractor would initially submit draft computerized measurement sheets and these measurements would be got checked/ test checked from the Engineer-in-charge and/or his authorized representative. The contractor will, thereafter, incorporate such changes as may be done during these checks/test checks in his draft computerized measurements, and submit to the department a computerized measurement book, duly bound, and with its pages machine numbered. The Engineer-in-charge and/or his authorized representative would thereafter check this MB, and record the necessary certificates for their checks/test checks.

The final, fair, computerized measurement book given by the contractor, duly bound, with its pages machine numbered, should be 100% correct, and no cutting or over-writing in the measurements would thereafter be allowed. If at all any errors is noticed, the contractor shall have to submit a fresh computerized MB with its pages duly machine numbered and bound, after getting the earlier MB cancelled by the department. Thereafter, the MB shall be taken in the Divisional Office records, and allotted a number as per the Register of Computerized MBs. This should be done before the corresponding bill is submitted to the Divisional Office for payment. The contractor shall submit two spare copies of such computerized MBs for the purpose of reference and record by the various officers of the department.

The contractor shall also submit to the department separately his computerized Abstract of Cost and the bill based on these measurements, duly bound, and its pages machine numbered along with two spare copies of the bill. Thereafter, this bill will be processed by the Division Office and allotted a number as per the computerized record in the same way as done for the measurement book meant for measurements.

The contractor shall, without extra charges, provide all assistance with every appliance, labour and other things necessary for checking of measurements/levels by the Engineer-in-charge or his representative.

Except where any general or detailed description of the work expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items which are not covered by specifications, measurements shall be taken in accordance with the relevant standard method of measurement issued by the Bureau of Indian Standards and if for any item no such standard is available then a mutually agreed method shall be followed.

The contractor shall give not less than seven days notice to the Engineer-in-charge or his authorized representative in charge of the work before covering up or otherwise placing beyond the reach of checking and/or test checking the measurement of any work in order that the same may be checked and/or test checked and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of checking and/or test checking measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the Engineer-in-charge or his authorized representative in-charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of checking and/or test checking measurements without such notice having been given or the Engineer-in-charge's consent being obtained in writing the same shall be uncovered at the Contractor's expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.

Engineer-in-charge or his authorized representative may cause either themselves or through another officer of the department to check the measurements recorded by contractor and all provisions stipulated herein above shall be applicable to such checking of measurements or levels.

It is also a term of this contract that checking and/or test checking the measurements of any item of work in the measurement book and/or its payment in the interim, on account of final bill shall not be considered as conclusive evidence as to the sufficiency of any work or materials to which it relates not shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.

CLAUSE 7: PAYMENT ON INTERMEDIATE CERTIFICATE TO BE REGARDED AS ADVANCES.

No payment shall be made for work, estimated to cost Rs. Twenty thousand or less till after the whole of the work shall have been completed and certificate of completion given. For works estimated to cost over Rs. Twenty thousand the interim or running account bills shall be submitted by the contractor for the work executed on the basis of such recorded measurements on the format of the Department in triplicate on or before the date of every month fixed for the same by the Engineer-in-Charge. The contractor shall not be entitled to be paid any such interim payment if the gross work done together with net payment/adjustment of advances for material collected, if any, since the last such payment is less than the amount specified in Schedule "F", in which case the interim bill shall be prepared on the appointed date of the month after the requisite progress is achieved. Engineer-in-Charge shall arrange to have the bill verified by taking or causing to be taken, where necessary the requisite measurements of the work. In the event of the failure of the contractor to submit the bills, Engineer-in-Charge shall prepare or cause to be prepared such bills in which event no claims whatsoever due to delays on payment including that of interest shall be payable to the contractor. Payment on account of amount admissible shall be made by the Engineer-in-Charge certifying the sum to which the contractor is considered entitled by way of interim payment at such rates as decided by the Engineer-in-Charge. The amount admissible shall be paid by 10th working day after the day of signing of contractor on the measurements prepared by department together with the account of the material issued by the department or dismantled materials, if any. In the case of works outside the headquarters of the Engineer-in-Charge, the period of ten working days will be extended to fifteen working days.

All such interim payments shall be regarded as payment by way of advances against final payment only and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be rejected, removed, taken away and reconstructed or re-erected. Any certificate given by the Engineer-in-Charge relating to the work done or materials delivered forming part of such payment may be modified or corrected by any subsequent such certificate(s) or by the final certificate and shall not by itself be conclusive evidence that any work or materials to which it relates is/are in accordance with the contract and specifications. Any such interim payment, or any part thereof shall not in any respect conclude, determine or affect in any way powers of the Engineer-in-Charge under the contract or any of such payments be treated as final settlement and adjustment of accounts or in anyway vary or affect the contract.

Pending consideration of extension of date of completion, interim payments shall continue to be made as herein provided without prejudice to the right of the department to take action under the terms of this contract for delay in the completion

of work, if the extension of date of completion is not granted by the competent authority.

The Engineer-in-Charge in his sole discretion on the basis of a certificate from the Asst. Engineer to the effect that the work has been completed up to the level in question make interim advance payments without detailed measurements for work done (other than foundations, items to be covered under finishing items) up to lintel level (including sunshade etc.) and slab level for each floor working out at 75% of the assessed value. The advance payments so allowed shall be adjusted in the subsequent interim bill by taking detailed measurements thereof.

CLAUSE 8: COMPLETION CERTIFICATE AND COMPLETION PLANS

Within ten days of the completion of the work, the contractor shall give notice of such completion to the Engineer-in-Charge and within thirty days of the receipt of such notice the Engineer-in-Charge shall inspect the work and if there is no defect in the work, shall furnish the contractor with a final certificate of completion, otherwise a provisional certificate of physical completion indicating defects (a) to be rectified by the contractor and/or (b) for which payment will be made at reduced rates, shall be issued. But no final certificate of completion shall be issued, nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall be executed all scaffolding, surplus materials, rubbish and all huts and sanitary arrangements required for his/their work people on the site in connection with the execution of the works as shall have been erected or constructed by the contractor(s) and cleaned off the dirt from all wood work, doors windows, walls, floor or other parts of the building in upon or about which the work is to be executed or of which he may have had possession for the purpose of the execution thereof, and not until the work shall have been measured by the Engineer-in-Charge. If the contractor shall fail to comply with the requirements of this Clause as to removal of scaffolding, surplus materials and rubbish and all huts and sanitary arrangements as aforesaid and cleaning off dirt on or before the date fixed for the completion of work, the Engineer-in-Charge may at the expense of the contractor remove such scaffolding, surplus materials and rubbish etc., and dispose of the same as he thinks fit and clean off such dirt as aforesaid, and the contractor shall have no claim in respect of scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof.

CLAUSE 8A: CONTRACTOR TO KEEP SITE CLEAN

When the annual repairs and maintenance of works are carried out, the splashes and droppings from white washing color washing, painting, etc., on walls, floor, windows, etc. shall be removed and the surface cleaned simultaneously with the completion of these items of work in the individual rooms, quarters or premises etc. where the work is done without waiting for the actual completion of all the other items of work in the contract. In case the contractor fails to comply with the requirements of this clause, the Engineer-in-Charge shall have the right to get this work done at the cost of the contractor either departmentally or through any other agency. Before taking such action, the Engineer-in-Charge shall give ten days notice in writing to the contractor.

CLAUSE 8B: COMPLETION PLANS TO BE SUBMITTED BY THE CONTRACTOR

The contractor shall submit completion plan as required vide General Specifications for Electrical works (Part-1 internal) 2005 and (Part-II external) 1994, as applicable within thirty days of the completion of the work.

In case, the contractor fails to submit the completion plan as aforesaid, he shall be liable to pay sum equivalent to 2.5% of the value of the work subject to a ceiling of Rs.15,000 (Rs. Fifteen thousand only) as may be fixed by the Superintending Engineer concerned and in this respect the decision of the Superintending Engineer shall be final and binding on the contractor.

CLAUSE 9 : PAYMENT OF FINAL BILL

The final bill shall be submitted by the contractor in the same manner as specified in interim bills within three months of physical completion of the work or within one month of the date of the final certificate of completion furnished by the Engineer-in-Charge whichever is earlier. No further claims shall be made by the contractor after submission of the final bill and these shall be deemed to have been waived and extinguished. Payments of those items of the bill in respect of which there is no dispute and of items in dispute, for quantities and rates as approved by Engineer-in-Charge, will, as far as possible be made within the period specified herein under, the period being reckoned from the date of receipt of the bill by the Engineer-in-Charge or his authorized Asstt. Engineer, complete with account of materials issued by the Department and dismantled materials.

i) If the Tendered value of work is up to Rs.15 Lakhs - 3 months

ii) If the Tendered value of work exceeds Rs.15 Lakhs - 6 months

CLAUSE 9A : PAYMENT OF CONTRACTOR'S BILLS TO BANK

Payments due to the contractor may if so desired by him be made to his bank instead of direct to him provided that the contractor furnishes to the Engineer-in-Charge (1) an authorization in the form of a legally valid document such as a power of attorney conferring authority on the bank to receive payments and (2) his own acceptance of the correctness of the account made out as being due to him by Government or his signature on the bills or other claim preferred against Government before settlement by the Engineer-in-Charge of the account or claim by payment to the bank. While the receipt given by such banks shall constitute a full and sufficient discharge for the payment, the contractor should wherever possible present his bills duly receipted and discharged through his bankers.

Nothing herein contained shall operate to create in favour of the bank any rights or equities vis-à-vis the President.

CLAUSE 10 : MATERIALS SUPPLIED BY GOVERNMENT

Materials which Government will supply are shown in Schedule 'A' which also stipulates quantum, place of issue and rate(s) to be charged in respect thereof. The contractor shall be bound to procure them from the Engineer-in-Charge.

As soon as the work is awarded, the contractor shall finalise the programme for the completion of work as per clause 5 of this contract and shall give his estimates of materials required on the basis of drawings/or schedule of quantities of the work. The contractor shall give in writing his requirement to the Engineer-in-Charge which shall be issued to him keeping in view the progress of work as assessed by the Engineer-in-Charge, in accordance with the agreed phased programme of work indicating monthly requirements of various materials. The contractor shall place his indent in writing for issue of such materials at least 7 days in advance of his requirement.

Such materials shall be supplied for the purpose of the contract only and the value of the materials so supplied at the rates specified in the aforesaid schedule shall be set off or deducted, as and when materials are consumed in items of work (including normal wastage) for which payment is being made to the contractor, from any sum then due or which may therefore become due to the contractor under the contract or otherwise or from the security deposit. At the time of submission of bills, the contractor shall certify that balance of materials supplied is available at site in original good condition.

The contractor shall submit along with every running bill (on account or interim bill) material-wise reconciliation statements supported by complete calculations reconciling total issue, total consumption and certified balance (diameter/section-wise in the case of steel) and resulting variations and reasons therefore. Engineer-in-Charge shall (whose decision shall be final and binding on the contractor) be within his rights to follow the procedure of recovery in clause 42 at any stage of the work if reconciliation is not found to be satisfactory.

The contractor shall bear the cost of getting the material issued, loading, transporting to site, unloading, storing under cover as required, cutting assembling and joining the several parts together as necessary. Not withstanding anything to the contrary contained in any other clause of the contract and (or the CPWA code) all stores/ materials so supplied to the contractor or procured with the assistance of the Government shall remain absolute property of Government and the contractor shall be the trustee of the stores/materials, and the said stores/materials shall not be removed/disposed off from the site of the work on any account and shall be at all times open to inspection by the Engineer-in-Charge or his authorised agent. Any such stores/materials remaining unused shall be returned to the Engineer-in-Charge in as good a condition in which they were originally supplied at a place directed by him, at a place of issue or any other place specified by him as he shall require but in case it is decided not to take back the stores/materials the contractor shall have no claim for compensation on any account of such stores/materials so supplied to him as aforesaid and not used by him or for any wastage in or damage to in such stores/ materials.

On being required to return the stores/materials, the contractor shall hand over the stores/materials on being paid or credited such price as the Engineer-in-Charge shall determine having due regard to the condition of the stores/materials. The price allowed for credit to the contractor, however, shall be at the prevailing market rate not exceeding the amount charged to him, excluding the storage charge, if any. The decision of the Engineer-in-Charge shall be final and conclusive. In the event of

breach of the aforesaid condition, the contractor shall in addition to throwing himself open to account for contravention of the terms of the licenses or permit and/or for criminal breach of trust, be liable to Government for all advantages or profits resulting or which in the usual course would have resulted to him by reason of such breach. Provided that the contractor shall in no case be entitled to any compensation or damages on account of any delay in supply or non-supply thereof all or any such material and stores provided further that the contractor shall be bound to execute the entire work if the materials are supplied by the Government within the original schedule time for completion of work plus 50% thereof or schedule time plus 6 months whichever is more if the time of completion of work exceeds 12 months, but if a part of the materials only has been supplied within the aforesaid period, then the contractor shall be bound to do so much of the work as may be possible with the materials and stores supplied in the aforesaid period. For the completion of the rest of the work, the contractor shall be entitled to such extension of time as may be determined by the Engineer-in-Charge whose decision in this regard shall be final and binding on the contractor.

The contractor shall see that only the required quantities of materials are got issued. Any such material remaining unused and in perfectly good/original condition at the time of completion or determination of the contract shall be returned to the Engineer-in-Charge at the stores from which it was issued or at a place directed by him by a notice in writing. The contractor shall not be entitled for loading, transporting, unloading and stacking of such unused material except for the extra lead, if any involved, beyond the original place of issue.

CLAUSE 10A : MATERIALS TO BE PROVIDED BY THE CONTRACTOR

The contractor shall, at his own expense, provide all materials, required for the works other than those which are stipulated to be supplied by the Government.

The contractor shall, at his own expense and without delay, supply to the Engineer-in-Charge samples of, materials to be used on the work and shall get these approved in advance. All such materials to be provided by the Contractor shall be in conformity with the specifications laid down or referred to in the contract. The Contractor shall, if requested by the Engineer-in-Charge furnish proof, to the satisfaction of the Engineer-in-Charge that the materials so comply. The Engineer-in-Charge shall within thirty days of supply of samples or within such further period as he may require intimate to the Contractor in writing whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the Engineer-in-Charge for his approval fresh samples complying with the specifications laid down in the contract. When materials are required to be tested in accordance with specifications, approval of the Engineer-in-Charge shall be issued after the test results are received.

The contractor shall at his risk and cost, submit the samples of materials to be tested or analyzed and shall not make use of or incorporate in the work any materials represented by the samples until the required tests or analysis have been made and materials finally accepted by the Engineer-in-Charge. The Contractor shall not be eligible for any claim or compensation either arising out of any delay in the work or due to any corrective measures required to be taken on account of and as a result of testing of materials.

The contractor shall, at his risk and cost, make all arrangements and shall provide all facilities as the Engineer-in-Charge may require for collecting and preparing the required number of samples for such tests at such time and to such place or places as may be directed by the Engineer-in-Charge and bear all charges and cost of testing unless specifically provided for otherwise elsewhere in the contract or specifications. Engineer-in-Charge or his authorised representative shall at all times have access to the works and to all workshops and places where work is being prepared or from where materials, manufactured articles or machinery are being obtained for the works and the contractor shall afford every facility and every assistance in obtaining the right to such access.

The Engineer-in-Charge shall have full powers to require the removal from the premises of all materials which in his opinion are not in accordance with the specifications and in case of default, the Engineer-in-Charge shall be at liberty to employ at the expense of the contractor, other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. The Engineer-in-Charge shall also have full powers to require other proper materials to be substituted thereof and in case of default, the Engineer-in-Charge may cause the same to be supplied and all costs which may attend such removal and substitution shall be borne by the Contractor.

CLAUSE 10B:

CLAUSE 10B (i): SECURED ADVANCE ON NON-PERISHABLE MATERIALS

The contractor, on signing an Indenture in the form to be specified by the Engineer-in-charge, shall be entitled to be paid during the progress of the execution of the work upto 90% of the assessed value of any materials which are in the opinion of the Engineer-in-charge non-perishable, non-fragile and non-combustible and are in accordance with the contract and which have been brought on the site in connection therewith and are adequately stores and/or protected against damage by weather or other causes but which have not at the time of advance been incorporated in the works. When materials on account of which an advances has been made under this sub-clause are incorporated in the work, the amount of such advance shall be recovered/deducted from the next payment made under any of the clause or clauses of this contract.

Such secured advance shall also be payable on other items of perishable nature fragile and combustible with the approval of the Engineer-in-charge provided the contractor provides a comprehensive insurance cover for the full cost of such materials. The decision of the Engineer-in-charge shall be final and binding on the contractor in this matter. No secured advance, shall however, be paid on high-risk materials such as ordinary glass, sand, petrol, diesel, etc.

CLAUSE 10B(ii) : MOBILISATION ADVANCE

Mobilization advance not exceeding 10% of the tendered value may be given, if requested by the contractor in writing within one month of the order to commence the work. In such a case, the contractor shall execute a Bank guarantee bond from a scheduled nationalized bank as specified by the Engineer-in-charge for the full amount of such advance is released. Such advance shall be in two or more

installments to be determined by the Engineer-in-charge at his absolute discretion. The first installment of such advance shall be released by the Engineer-in-charge to the contractor on a request made by the contractor to the Engineer-in-charge in this behalf. The second and subsequent installments shall be released by the Engineer-in-charge only after the contractor furnishes a proof of the satisfactory utilization of the earlier installment to the entire satisfaction of the Engineer-in-charge.

Provided always that provision of clause 10B (ii) shall be applicable only when so provided in schedule "F"

CLAUSE 10B(iii) : PLANT MACHINERY & SHUTTERING MATERIAL ADVANCE

An advance for plant, machinery & shuttering material required for the work and brought to site by the contractor may be given if requested by the contractor in writing within one month of bringing such plant and machinery to site. Such advance shall be given on such plant and machinery, which in the opinion of the Engineer-in-charge will add to the expeditious execution of work and improve the quality of work. The amount of advance shall be restricted to 5% of the tender value. In the case of new plant and equipment to be purchased for the work, the advance shall be restricted to 90% of the price of such new plant and equipment paid by the contractor for which the contractor shall produce evidence satisfactory to the Engineer-in-charge. In the case of second hand and used plants and equipment, the amount of such advance shall be limited to 50% of the depreciated value of plant and equipment as may be decided by the Engineer-in-charge. The contractor shall, if so required by the Engineer-in-charge, submit the statement of value recognized by the Central Board of Direct Taxes under the Income-Tax Act, 1961. No such advance shall be paid on any plant and equipment of perishable nature and on any plant and equipment of a value less than Rs.50,000/- seventy five percent of such amount of advance shall be paid after the plant & equipment is brought to site and balance twenty five percent successfully commissioning the same.

Leasing of equipment shall be considered on par with purchase of equipment and shall be covered by the tripartite agreement with the following:

1. Leasing company which gives certificate of agreeing to lease equipment to the contractor.

2. Engineer-in-charge and

3. The contractor

This advance shall further be subject to the condition that such plant and equipment (a) are considered by the Engineer-in-charge to be necessary for the work; (b) and are in and are maintained in working order (c) hypothecated to the Government as specified by the Engineer-in-charge before the payment of advance is released. The contractor shall not be permitted to remove from the site such hypothecated plant and equipment without the prior written permission of the Engineer-in-charge. The contractor shall be responsible for maintaining such plant and equipment in good working order during the entire period of hypothecation falling which such advance shall be entirely recovered in lump sum. For this purpose, steel scaffolding and form work shall be treated as plant and equipment.

The contractor shall insure the plant and machinery for which mobilization advance is sought and given, for a sum sufficient to provide for their replacement at site. Any amounts not recovered from insurer will be borne by the contractor.

CLAUSE 10B(iv) : INTEREST & RECOVERY

The mobilization advance and plant and machinery advance in (ii) & (iii) above bear simple interest at the rate of 10 percent per annum and shall be calculated from the date of payment to the date of recovery, both days inclusive, on the outstanding amount of advance. Recovery of such sums advanced shall be made by the deduction from the contractor's bills commencing after first ten percent of the gross value of the work is executed and paid, on pro-rata percentage basis to the gross value of the work billed beyond 10% in such a way that the entire advance is recovered by the time eighty percent of the gross value of the contract is executed and paid, together with interest due on the entire outstanding amount upto the date of recovery of the installment. If the circumstances are considered reasonably by the Engineer-in-charge, the period mentioned in (ii) and (iii) for request by the contractor in writing for grant of mobilization advance and plant and equipment advance may be extended in the discretion of the Engineer-in charge.

The said bank guarantee for advances shall initially be made for the full amount and valid for the contract period, and be kept renewed from time to time to cover the balance amount and likely period of complete recovery together with interest

CLAUSE 10C: PAYMENT ON ACCOUNT OF INCREASE IN PRICES/WAGES DUE TO STATUTORY ORDER(S) - DELETED

CLAUSE 10CA: Payment due to VARIATION IN PRICES OF MATERIALS AFTER RECEIPT OF TENDER

If, after submission of the tender, the price of material specified in Schedule "F" increases/decreases beyond the price(s) prevailing at the time of the last stipulated date for receipt of tenders (including extensions, if any) for the work, then the amount of the contract shall accordingly be varied and provided further that any such variations shall be effected for stipulated period of contract including the justified period extended under the provisions of clause 5 of the contract without any action under clause 2.

However for the work done/during the justified period extended as above, it will be limited to indices prevailing at the time of stipulated date of completion or as prevailing for the period under consideration, whichever is less.

The increase / decrease in prices shall be determined by the All India Wholesale Price Indices of materials as published by Economic Adviser to Government of India, Ministry of Commerce and Industry and base price for cement and/or steel reinforcement bars as issued under authority of Engineer-in charge as valid in the last stipulated date of receipt of tender, including extension, if any, and for the period under consideration incase, price index of a particular material is not issued by Ministry of Commerce & Industry, then the price index of nearest similar materials is indicated in Schedule "F" shall be followed.

The amount of the contract shall accordingly be varied for cement and/or steel reinforcement bars and will be worked out as per the formula given below for individual material:

a) Adjustment for component of individual material:

$$V = P \times Q \times \frac{(CI - CIo)}{CIo}$$

Where,

V: Variation in material cost i.e. increase or decrease in the amount in rupees to be paid or recovered.

P: Base price of material as issued under authority of Engineer-in charge, valid at the time of the last stipulated date of receipt of tender including extensions, if any.

Q: Quantity of material used in the works since previous bill.

CIo: All India whole sale price index for material as Published by the Economic Advisor to Government of India, Ministry of Industry and Commerce as valid on the last stipulated date of receipt of tenders including extensions, if any.

CI: All India whole sale price Index for material for period under consideration as published by Economic Advisor to Government of India, Ministry of Industry and Commerce.

(In respect of the justified period extended under the provisions of clause 5 of the contract without any action under clause 2, the index prevailing at the time of stipulated date of completion or the prevailing index of the period under consideration, whichever is less, shall be considered)

CLAUSE 10 (CC): PAYMENT DUE TO INCREASE / DECREASE IN PRICES /WAGES AFTER RECEIPT OF TENDER FOR WORKS

If the prices of materials (not being materials supplied or services rendered at fixed prices by the department in accordance with clause 10 & 34 thereof) and/or wages of labour required for execution of the work increase; the contractor shall be compensated for such increase as per provisions detailed below and the amount of the contract shall accordingly be varied, subject to the condition that such compensation for escalation in prices and wages shall be available **only for the work done during the stipulated period** of the contract including the justified period extended under the provisions of clause 5 of the contract without any action under clause 2. However, for the work done during the justified period extended as above, the compensation as detailed below will be limited to prices/wages prevailing at the time of stipulated date of completion or as prevailing for the period under consideration, whichever is less. No such compensation shall be payable for a work for which the stipulated period of completion is equal to or less than the time as specified In schedule"F". Such compensation for escalation in the prices of materials and labour, when due, shall be worked out based on the following provisions:-

(i) The base date for working out such escalation shall be the last stipulated date of receipt of tenders including extension, if any.

(ii) The cost of work on which the escalation will be payable shall be reckoned as below:

a) Gross value of work done upto this quarter…… (A)

b) Gross value of work done upto the last quarter..... (B)

c) Gross value of work done since previous quarter (A-B) :.....(C)

d) Full assessed value of Secured Advance fresh paid in this quarter :(D)

e) Full assessed value of Secured Advance recovered in this quarter :(E)

f) Full assessed value of Secured Advance for which escalation is payable in this quarter (D-E)..... (F)

g) Advance payment made during this quarter..... (G)

h) Advance payment recovered during this quarter..... (H)

i) Advance payment for which escalation is payable in this quarter (GH)..... (I)

j) Extra items/deviated quantities of item paid as per Clause 12 based on prevailing market rates during this quarter... (J)

Then, **M = C + F + I –J**

N = 0.75 x M

k) Less cost of material supplied by the Department as per Clause 10 and recovered during the quarter. (K)

l) Less cost of services rendered at fixed charges and recovered as per clause 34 and recovered during the quarter. (L)

Cost of work for which escalation is applicable

W=N-(K+L)

(iii) Components of CEMENT, STEEL, materials, labour, P.O.L., etc. shall be pre-determined for every work and incorporated in the special conditions of contract attached (to the tender paper) here-in-after. The decision of the Engineer-in-Charge in working out such percentages shall be binding on the contractors.

(iv) The compensation for escalation for CEMENT, STEEL, materials and P.O.L. shall be worked as per the formulae given below:

a) Adjustment for component of

"Cement" CIo CIo CI Xc W Vc −× × = 100

Vc: Variation in cement cost i.e. increase or decrease in the amount in rupees to be paid or recovered.

W: Cost of work done, worked out as indicated in sub para (ii) of clause 10CC.

Xc: Component of cement expressed as percent of the total value of work.

CI: All India Wholesale price Index for cement for the period under consideration as published by the Economic Advisor to Government of India, Ministry of Industry & Commerce. (In respect of the justified period extended under the provisions of clause 5 of the contract without any action under clause2, the index prevailing at the time of stipulated date of completion or the prevailing index of the period under consideration, whichever is less, shall be considered).

CI0: All India Whole Sale Price Index for Cement as published by the Economic Adviser to Government of India, Ministry of Industry and Commerce as valid on the last stipulated date of receipt of tenders including extension, if any.

b) Adjustment for component of

"Steel" SIo SIo SI Xs W Vs − × × = 100

VS: Variation in steel cost i.e. increase or decrease in the amount in rupees to be paid or recovered.

W: Cost of work done, worked out as indicated in sub para (ii) of above.

XS: Component of steel expressed in percent to the total value of work. (as indicated under Para 21 of special conditions of contract).

SI: All India Wholesale Price Index for steel (bars & rods) for the period under consideration as published by Economic Advisor to the Government of India, Ministry of Industry & Commerce. However, the Price Index shall be minimum of the following:-(i) Index for the month when the last consignment of steel reinforcement for the stipulated contract period is over.

(ii) Index for the month by which half of the stipulated contract period is over.

(iii) Index for the period under consideration. For the justified period extended under the provisions of clause 5 of the contract, without any action under clause 2, the same principle as for the period within stipulated period of completion, will apply. a) For the month when the last consignment of steel reinforcement for the work is procured or

b) For the month in which half of the stipulated contract period is over. Whichever of these two is earlier.

SI0 : All India Whole Sale Price Index for Steel (Bar & Rods) published by the Economic Adviser to Government of India, Ministry of Industry and Commerce New Delhi, as valid on the last stipulated date of receipt of tender including extension, if any.

c) Adjustment for component of "Material" (except cement & steel / electrical component of construction material)

Mio MIo MI X W V M M − × × = 100

VM: Variation in Materials cost i.e. increase or decrease in the amount in rupees to be W: Cost of work done, worked out as indicated in sub Para (ii) of above.

XM: Component of Materials expressed as percent of the total value of work.

MI: All India Wholesale Price Index for civil component/electrical component of construction material as worked out on the basis of All India Wholesale Price Index for individual Commodities/Group items for the period under consideration as published by Economic Advisor to Government of India, Ministry of Industry & Commerce and applying weightages to the individual Commodities/Group items.

(In respect of the justified period, extended under the provisions of clause 5 of the contract without any action under clause 2, the index prevailing at the time of stipulated date of completion or the prevailing index of the period under consideration, which ever is less, shall be considered).

MI0 : All India Whole Sale Price Index for civil component / electrical component of construction materials as worked out on the basis of All India whole sale Price Index for Individual Commodities/ group items valid on the last stipulated date of receipt of tender including extension, if any, as published by the Economic Adviser to Government of India, Ministry of Industry and Commerce, and applying weightages to Individual Commodities / group Items

d) Adjustment for component of "POL"

FIo FIo FI Z W VF − × × =

VF: Variation in cost of Fuel, Oil and Lubricant i.e. increase or decrease in the amount in rupees to be paid or recovered.

W: Value of work done, worked out as indicated in sub Para (ii) of clause 10CC.

Z: Component of Fuel, Oil and Lubricant expressed as percent of the total value of work.

FI: All India Wholesale Price Index for Fuel, Oil & Lubricant for the period under consideration as published by Economic Advisor to Government of India, Ministry of Industry & Commerce, New Delhi.

(In respect of the justified period extended under the provisions of clause 5 of the contract without any action under clause 2, the index prevailing at the time of

stipulated date of completion or the prevailing index of the period under consideration, whichever is less, shall be considered).

FI0: All India Whole Sale Price Index for Fuel, Oil and Lubricant as published by the Economic Adviser to Government of India, Ministry of Industry and Commerce, New Delhi valid on the last stipulated date of receipt of tender including extension, if any.

v) The following principles shall be followed while working out the indices mentioned in para (iv) above.

(a) The compensation for escalation shall be worked out at done as per bills paid during the three calendar months of the said quarter. The first such payment shall be made at the end of three months after the month (excluding) in which the tender was accepted and thereafter at three months interval. At the time of completion of the work, the last period for payment might become less than 3 months, depending on actual date of completion.

(b) The index (MI / FI etc.) relevant to any quarter / period average of the indices relevant to the three calendar months. If the period up to date of completion after the quarter covered by the last such installment of payment, is less than three months, the index MI & FI shall be the average of the indices for the months falling within that period.

vi) The **compensation for escalation for labour** shall be worked out as per the formula given below:

$$VL = W \times Y \times \frac{LI - LIo}{LIo} \times 100$$

VL: Variation in labour cost i.e. amount of increase or decrease in rupees to be paid or recovered.

W: Value of work done, worked out as indicated in sub-Para (ii) above.

Y: Component of labour expressed as a percent of the total value of the work

LI0: Minimum daily wage in rupees of an unskilled adult male mazdoor, fixed under any law, statutory rule or order as on the last stipulated date of receipt of tender including extension, if any.

LI: Minimum wage in rupees of an unskilled adult male mazdoor, fixed under any law, statutory rule or order as applicable on the last date of the quarter previous to the one under consideration. (In respect of the justified period extended under the provisions of clause 5 of the contract, without any action under clause 2, the minimum wage prevailing on the last date of quarter previous to the quarter pertaining to stipulated date of Completion or the minimum wage prevailing on the last date of quarter previous to the one under consideration, whichever is less, shall be considered.)

vii) The following principles will be followed while working out the compensation as per sub para (vi) above.

a) The minimum wage of an unskilled Male Mazdoor mentioned in sub para (vi) above shall be the higher of the wage notified by Government of India, Ministry of Labour and that notified by the local administration, both relevant to the place of work and the period of reckoning.

b) The escalation for labour also shall be paid at the same quarterly intervals when escalation due to increase in cost of materials and/or P.O.L. is paid under this clause. If such revision of minimum wages takes place during any such quarterly intervals, the escalation compensation shall be payable at revised rates only for work done in subsequent quarters.

c) Irrespective of variation in minimum wages of any category of labour, for the purpose of this clause, the variation in the rate for an unskilled adult Male Mazdoor alone shall form the basis for working out the escalation compensation payable on the labour component.

viii) In the event the price of materials and/or wages of labour required for execution of the work decrease(s), there shall be a downward adjustment of the cost of work so that such price of materials and/or wages of labour shall be deductable from the cost of work under this contract and in this regard the formula herein before stated under this clause 10 CC shall mutatis-mutandis apply, provided that:

(a) No such adjustment for the decrease in the price of materials and/or wages of labour aforementioned would be made in case of contracts in which the stipulated period of completion of the work is equal to or less than the time as specified in Schedule "F".

(b) The Engineer-in-Charge shall otherwise be entitled to lay down the procedure by which the provision of this sub-clause shall be implemented from time to time and the decision of the Engineer-in-Charge in this behalf shall be final and binding on the contractor.

ix) Provided always that the provision of the preceding 10 CA shall not be applicable for contracts where provisions of this clause are applicable, but in cases where provisions of this clause are not applicable, the provisions of Clause 10 CA will become applicable.

CLAUSE 10D : DISMANTLED MATERIALS GOVT. PROPERTY:

The contractor shall treat all materials obtained during dismantling of a structure, excavation of the site for a work etc. as Governments property and such materials shall be disposed off to the best advantage of Government according to the instructions in writing issued by the Engineer-in-Charge.

CLAUSE 11 : WORK TO BE EXECUTED AS PER SPECIFICATIONS, DRAWINGS, ORDERS, ETC.

The contractor shall execute the whole and every part of the work in the most substantial and workman like manner and both as regards materials and otherwise in every respect in strict accordance with the specifications. The contractor shall also conform exactly fully and faithfully to the designs, drawings and instructions in writing in respect of the work signed by the Engineer-in-Charge and the contractor

shall be furnished free of charge one copy of the contract documents together with specifications, design, drawings and instructions as or not included in the standard specifications of DAE, CPWD,BIS, Indian standards specified in Schedule "F" or in any Bureau of Indian Standard or any other, public standard or code or schedule of rates or any other printed publications referred to elsewhere in the contract.

The contractor shall comply with the provisions of the contract and with the care and diligence execute and maintain the works and provide all labour and materials, tools and plants including for measurements and supervision of all works, structural plans and other things of temporary or permanent nature for such execution and maintenance in so for as the necessary for providing these, is specified or is reasonably inferred from the contract. The contractor shall take full responsibility for adequacy, suitability and safety of all the works and methods of construction

CLAUSE 12 : DEVIATIONS / VARIATIONS : EXTENT AND PRICING

The Engineer-in-Charge shall have power (i) to make alteration in, omissions from, additions to or substitution for the original specifications, drawings, designs and instructions that may appear to him to be necessarily advisable during the progress of the work and (ii) to omit a part of the works in case of non-availability of a portion of the site or for any other reasons and the contractor shall be bound to carry out the works in accordance with any instructions given to him in writing signed by the Engineer-in-Charge and such alterations, omissions, additions, substitutions shall form part of the contract as if originally provided therein and any altered, additional or substituted work which the contractor may be directed to do in the manner specified above as part of the works shall be carried out by the contractor on the same conditions in all respects including price on which he agreed to do the main work except as hereafter provided.

12.1: The time for completion of the work shall, in the event of any deviations resulting in additional cost over the tendered value sum being ordered, be extended, if requested by the contractor as follows:

(i) In the proportion which the additional cost of the altered, additional or substituted work, bears to the original tendered value, plus (ii) 25% of the time calculated in (i) above or such further additional time as may be considered reasonable by the Engineer-in-Charge.

12.2 : DEVIATION, EXTRA ITEMS AND PRICING

In the case of extra item(s), the contractor may within fifteen days of receipt of order or occurrence of the item(s) claim rates, supported by proper analysis, for the work and the engineer-in-charge shall within one month of the receipt of the claims supported by analysis, after giving consideration to the analysis of the rates submitted by the contractor, determine the rates on the basis of the market rates and the contractor shall be paid in accordance with the rates so determined. In the case of substituted items, the rate for the agreement items (to be substituted) and substituted item shall also be determined in the manner as mentioned in the aforesaid para:

a) DEVIATION, SUBSTITUTED ITEMS PRICING

If the market rate for the substituted item so determined is more than the market rate of the agreement item (to be substituted), the rate payable to the contractor for the substituted item shall be the rate for the agreement item (to be substituted) so increased to the extent of the difference between the market rate of substituted item and the agreement item (to be substituted).

b) If the market rate for the substituted item so determined is less than the market rate of the agreement item (to be substituted), the rate payable to the contractor for the substituted item shall be the rate for the agreement item (to be substituted) so decreased to the extent of the difference between the market rate of substituted item and the agreement item (to be substituted).

DEVIATION, DEVIATED QUANTITIES, PRICING

In the case of contract items, substituted items, contract cum substituted items, which exceed the deviation limit mentioned below, the contractor may within fifteen days of receipt of order or occurrence of the excess, claims revision of the rates, supported by proper analysis, for the work in excess of the above mentioned limits, provided that if the rates so claimed are in excess of the rates specified in the schedule of quantities, the Engineer-in-Charge shall within one month of receipt of the claims supported by analysis, after giving consideration the analysis of the rates submitted by the contractor, determine the rates on the basis of the market rates and the contractor shall be paid in accordance with the rates so determined.

12.3: The provisions of the preceding paragraph shall also apply to the decrease in the rates of items for the works in excess of the deviation limits as given below, and the Engineer-in-Charge shall after giving notice to the contractor within one month of occurrence of the excess and after taking into consideration any reply received from him within fifteen days of the receipt of the notice, revise the rates of the work in question within one month of the expiry of the said period of fifteen days having regard to the market rates.

12.4: The contractor shall send to the Engineer-in-Charge once every three months an upto date account giving complete details of all claims for additional payments to which the contractor may consider himself entitled as an all additional work ordered by the Engineer-in-Charge, which he has executed during the preceding quarter failing which the contractor shall be deemed to have waived his right. However, the Engineer-in-Charge may at consideration of such claims on merits.

12.5: For the purpose of operation of Schedule “F”, the following works shall be treated as works relating to foundations:

i) For buildings, compound walls, plinth level or 1.2 metres (4 feet) above ground level whichever is Lower than excluding items of flooring and D.P.C but including base concrete below the floors.

ii) For abutments, piers, retaining walls of culverts and bridges, walls of water reservoirs: the bed of floor level.

iii) For retaining walls where floor level is not determinate: 1.2 metres above the average ground level or bed level.

iv) For roads: All items of excavations and filling including treatment of sub-base.

12.6 : Any operation incidental to or necessarily has to be in contemplation of tenderer while filling tenders, necessary for proper execution of the item included in the Schedule of Quantities or in the schedule of rates mentioned above, whether or not, specifically indicated in the description of the item and the relevant specifications, shall be deemed to be included in the rates quoted by the tenderer or the rate given in the schedule of rates, as the case may be, Nothing extra shall be admissible for such operations.

CLAUSE 13 : FORECLOSURE OF CONTRACT DUE TO ABANDONMENT OR REDUCTION IN SCOPE OF WORK

If at any time after acceptance of the tender Government shall decide to abandon or reduce the scope of the work for any reason whatsoever and hence not require the whole or any part of the works to be carried out, the Engineer-in-charge shall give notice in writing to that effect to the contractor and the contractor shall act accordingly in the matter. The contractor shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the works in full but which he did not derive in consequence of the foreclosure of the whole or part of the works.

The contractor shall be paid at contract rates full amount for works executed at site and in addition, a reasonable amount as certified by the Engineer-in-charge for the items hereunder mentioned which could not be utilised on the work to the full extent in view of the foreclosure.

i) Any expenditure incurred on preliminary site work, e.g. temporary access roads, temporary labour huts, staff quarters and site office, storage accommodation and water storage tanks.

ii) Government shall have the option to take over contractor’s materials or any part thereof either brought to site or of which the contractor is legally bound to accept delivery from suppliers (for incorporation in or incidental to the work) provided however, Government shall be bound to take over the materials or such portions thereof as the contractor does not desire to retain. For materials taken over or to be taken over by Government cost of such materials as detailed by Engineer-in-charge shall be paid. The cost shall, however, take into account purchase price, cost of transportation and deterioration or damage which may have been caused to materials whilst in the custody of the contractor.

iii) If any materials supplied by Government are rendered surplus, the same except normal wastage shall be returned by the contractor to Government at rates not exceeding those at which these were originally issued less allowance for any deterioration or damage which may have been caused whilst the materials were in the custody of the contractor. In addition, cost of transporting such materials from site to Government stores, if so required by Government, shall be paid.

iv) Reasonable compensation for transfer of T & P from site to contractor's permanent stores or to his other works, whichever is less. If T & P are not transported to either of the said places, no cost of transportation shall be payable.

v) Reasonable compensation for repatriation of contractor's site staff and imported labour to the extent necessary.

The contractor shall, if required by the Engineer-in-charge furnish to him books of account, wage books, time sheets and other relevant documents and evidence as may be necessary to enable him to certify the reasonable amount payable under this condition.

The reasonable amount of items on (i), (iv) and (v) above shall not be in excess of 2% of the cost of the work remaining incomplete on the date of closure, i.e. total stipulated cost of the work as per accepted tender less the cost of work actually executed under the contract and less the cost of contractor's materials at site taken over by the Government as per item (ii) above 'Provided always that against any payments due to the contractor on this account or otherwise, the Engineer-in-charge shall be entitled to recover or be credited with any outstanding balances due from the contractor for advance paid in respect of any tool, plants and materials and any other sums which at the date of termination were recoverable by the Government from the contractor under the terms of the contract.

CLAUSE 14 : CANCELLATION OF CONTRACT IN FULL OR PART

Deleted (Merged with clause 3)

CLAUSE 15 : SUSPENSION OF WORK

i) The contractor shall, on receipt of the order in writing of the Engineer-in-Charge,(whose decision shall be final and binding on the contractor) suspend the progress of the works or any part thereof for such time and in such manner as the Engineer-in-Charge may consider necessary so as not to cause any damage or injury to the work already done or endanger the safety thereof for any of the following reasons:

(a) on account of any default on the part of the contractor or;

(b) for proper execution of the works or part thereof for reasons other than the default of the contractor; or

(c) for safety of the works or part thereof. The contractor shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in that behalf by the Engineer-in-Charge.

ii) If the suspension is ordered for reasons (b) and (c) in sub-Para (i) above:

(a) the contractor shall be entitled to an extension of time equal to the period of every such suspension PLUS 25%, for completion of the item or group of items of work for which a separate period of completion is specified in the contract and of which the suspended work forms a part, and;

(b) If the total period of all such suspensions in respect of an item or group of items of work for which a separate period of completion is specified in the contract exceeds thirty days, the contractor shall, in addition, be entitled to such compensation as the Engineer-in-Charge may consider reasonable in respect of salaries and/or wages paid by the contractor to his employees and labour at site, remaining idle during the period of suspension, adding thereto 2% to cover indirect expenses of the contractor. Provided the contractor submits his claim supported by details to the Engineer-in-Charge within fifteen days of the expiry of the period of 30 days.

iii) If the works or part thereof is suspended on the orders of the Engineer-in-Charge for more than three months at a time, except when suspension is ordered for reasons (a) in sub-para (i) above, the contractor may after receipt of such order serve a written notice on the Engineer-in-Charge requiring permission within fifteen days from receipt by the Engineer-in-Charge of the said notice, to proceed with the work or part thereof in regard to which progress have been suspended and if such permission is not granted within that time, the contractor, if he intends to treat the suspension, where it affects only a part of the works as an omission of such part by Government or where it affects whole of the works, an abandonment of the works by Government, shall within ten days of expiry of such period of 15 days give notice in writing of his intention to the Engineer-in-Charge. In the event of the contractor treating the suspension as an abandonment of the contract by Government, he shall have no claim to payment of any compensation on account of any profit or advantage which he might have derived from the execution of the work in full but which he could not derive in consequence of the abandonment. He shall, however, be entitled to such compensation, as the Engineer-in-Charge may consider reasonable, in respect of salaries and/or wages paid by him to his employees and labour at site, remaining idle in consequence adding to the total thereof 2% to cover indirect expenses of the contractor provided the contractor submits his claim supported by details to the Engineer-in-Charge within 30 days of the expiry of the period of 3 months.

Provided, further, that the contractor shall not be entitled to claim any compensation from Government for the loss suffered by him on account of delay by Government in the supply of materials in schedule 'B' where such delay is covered by difficulties relating to the supply of wagons, force majeure including non-allotment of such materials by controlling authorities, acts of God, acts of enemies of the state/country or any reasonable cause beyond the control of the Government.

CLAUSE 16 : ACTION IN CASE WORK NOT DONE AS PER SPECIFICATIONS :

All works under or in course of execution or executed in pursuance of the contract shall at all times be open and accessible to the inspection and supervision of the Engineer-in-Charge, his authorised subordinates in charge of the work and all the superior officers, officer of the Quality Assurance Unit of the Department or any organization engaged by the Department for Quality Assurance and of the Chief Technical Examiner's Office, and the contractor shall, at all times, during the usual working hours and at all other times at which reasonable notice of the visit of such officers has been given to the contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for

that purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.

If it shall appear to the Engineer-in-Charge or his authorised subordinates in charge of the work or to the Chief Engineer in charge of Quality Assurance cell or his subordinate officers or the officers of the organization engaged by the Department of Quality Assurance or to the Chief Technical Examiner or his subordinate officers, that any work has been executed with unsound, imperfect, or unskillful workmanship, or with materials or articles provided by him for the execution of the work which are unsound or of a quality inferior to that contracted or otherwise not in accordance with the contract, the contractor shall, on demand in writing which shall be made within twelve months (Six months in the case of work costing Rs.10Lakh and below except road work) of the completion of the work from the Engineer-in-Charge specifying the work, materials or articles complained of notwithstanding that the same may have been passed, certified and paid for forthwith rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost. In the event of the failing to do so within a period specified by the Engineer-in-Charge in his demand aforesaid, then the contractor shall be liable to pay compensation at the same rate as under clause 2 of the contract (for non-completion of the work in time) for this default.

In such case the Engineer-in-Charge may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the Schedule "F" may consider reasonable during the preparation of on account bills or final bill if the item is so acceptable without detriment to the safety and utility of the item and the structure or he may reject the work outright without any payment and/or get it and other connected and incidental items rectified, or removed and re-executed at the risk and cost of the contractor. Decision of the Engineer-in-Charge to be conveyed in writing in respect of the same will be final and binding on the contractor.

CLAUSE 17 : CONTRACTOR LIABLE FOR DAMAGES, DEFECTS DURING MAINTENANCE PERIOD

If the contractor or his working people or servants shall break, deface, injure or destroy any part of building in which they may be working, or any building, road, road kerb, fence, enclosure, water pipe, cables, drains, electric or telephone post or wires, trees, grass or grassland, or cultivated ground contiguous to the premises on which the work or any part of it is being executed, or if any damage shall happen to the work while in progress, from any cause whatever or if any defect, shrinkage or other faults appear in the work within 12 months (6 months in the case of work costing Rs. 10,00,000/- and below except road work) after a certificate final or otherwise of its completion shall have been given by the Engineer-in-Charge as aforesaid arising out of defect or improper materials or workmanship, the contractor shall upon receipt of a notice in writing on that behalf make the same good at his own expense, or in default, the Engineer-in-Charge cause the same to be made good by other workmen and deduct the expense from any sums that may be due, or at any time thereafter may become due to the contractor, or from his security deposit, or the proceeds of sale thereof or of a sufficient portion thereof. The

security deposit of the contractor shall not be refunded before the expiry of 12 months (6 months in the case of work costing Rs. 10,00,000/- and below except road work) after the issue of the certificate final or otherwise, of completion of work, or till the final bill has been prepared and passed whichever is later. Provided that in the case of road work, if in the opinion of the Engineer-in-Charge, half of the security deposit is sufficient to meet all the liabilities of the contractor under this contract, half of the security deposit will be refundable after 6 months and the remaining half after 12 months of the issue of the said certificate of completion or till the final bill has been prepared and passed whichever is later. Performance Security shall be refunded to the contractor after completion of the work and recording the completion certificate.

In case of maintenance and operation of E&M services, the security deposit deducted from contractors shall be refunded within one month from the date of final payment or within one month from the date of completion of the maintenance contract, whichever is earlier

CLAUSE 18: CONTRACTOR TO SUPPLY TOOLS, PLANTS.

The contractor shall provide at his own cost all materials (except such special materials, if any, as may in accordance with the contract be supplied from the Engineer-in-Charge's stores), machinery, tools & plants as specified in schedule "F". in addition of this other plant, tools, appliances, implements, ladders, cordage, tackle, scaffoldings and temporary works requisite or proper for the proper execution of the work, whether original, altered or substituted and whether included in the specification or other documents forming part of the contract or referred to in these conditions or not, or which may be necessary for the purpose of satisfying or complying with the requirements of the Engineer-in-Charge as to any matter as to which under these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage therefore to and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials, necessary for the purpose of setting out works, and counting, weighing and assisting in the measurement or examination at any time and from time to time of the work or materials. Failing his so doing the same may be provided by the Engineer-in-Charge at the expense of the contractor and the expenses may be deducted, from any money due to the contractor, under the contract and/or from his security deposit or the proceeds of sale thereof, or of sufficient portions thereof.

CLAUSE 18A: RECOVERY OF COMPENSATION PAID TO WORKMAN

In every case in which by virtue of the provisions of section 12 sub-section (1) of the Workmen's Compensation Act. 1923, Government is obliged to pay compensation to a workman employed by the contractor, in execution of the works, Government will recover from the contractor the amount of the compensation so paid; and, without prejudice to the rights of the Government under Section 12, sub-section (2) of section 12 the said Act, Government shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by Government to the contractor whether under this contract or otherwise. Government shall not be bound to contest any claim made against it under section (1) of 12, sub-section the said Act, except on the written request of the contractor

and upon his giving to Government full security for all costs for which Government might become liable in consequence of contesting such claim.

CLAUSE 18B: ENSURING PAYMENT AND AMENITIES TO WORKERS IF CONTRACTOR FAILS TO DO SO

In every case in which by virtue of the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 and of the contract labour (Regulation and Abolition) Central Rules, 1971, Government is obliged to pay any amounts of wages to a workman employed by the contractor in execution of the works, or to incur any expenditure in providing welfare and health amenities required to be provided under the above said Act and the Rules, under Clause 19 H or under the DAE Contractor's Labour Regulations, or under the rules framed by Government from time to time for the protection of health and sanitary arrangements for workers employed by Department of Atomic Energy contractors, Government will recover from the contractor the amount of wages so paid or the amount of expenditure so incurred; and without prejudice to the rights of the Government under Section 20, sub-section (2) and Section 21, sub-section (4) of the contract labour (Regulation and Abolition) Act, 1970, Government shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by Government to the contractor whether under this agreement or otherwise. Government shall not be bound to contest any claim made against it under Section 20, sub-section (1) and section 21, sub-section (4) of the said Act, except on the written request of the contractor and upon his giving to the Government full security for all costs for which Government might become liable in contesting such claim.

CLAUSE 19: LABOUR LAWS TO BE COMPLIED BY THE CONTRACTOR

The contractor shall obtain a valid license under the Contract Labour (R & A) Act, 1970 and the Contract Labour (Regulation and Abolition) Central Rules, 1971, before the commencement of the work, and continue to have a valid license until the completion of the work. The contractor shall also abide by the provision of the Child Labour (Prohibition & Regulation) Act-1986. The contractor shall also comply with the provisions of the building and other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996 and the building and other Construction Workers Welfare Cess Act, 1996.Any failure to fulfill these requirements shall attract the penal provisions of this contract arising out of the resultant non-execution of the work.

CLAUSE 19A: NO LABOUR BELOW 18 YEARS

No labour below the age of 18 (Eighteen) years shall be employed on the work.

CLAUSE 19B: PAYMENT OF WAGES

i) 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 DAE, Contractor's Labour Regulations or as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 and the Contract Labour (Regulation and Abolition) Central Rules, 1971, wherever applicable.

ii) The contractor shall notwithstanding the provisions of any contract to the contrary, cause to be paid fair wage to labour indirectly engaged on the work, including any labour engaged by his sub-contractors in connection with the said work, as if the labour had been immediately employed by him.

iii) In respect of all labour directly or indirectly employed in the works for performance of the contractor's part of this agreement, the contractor shall comply with or cause to be complied with the DAE Contractor Labour Regulations made by Government from time to time in regard to payment of wages, wage period, deductions from wages, recovery of wages not paid and deductions unauthorisedly made, maintenance of wage books or wage slips, publication of scale of wages and other terms of employment, inspection and submission of periodical returns and all other matters of the like nature or as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 and the Contract Labour (Regulation and Abolition) Central Rules 1971, wherever applicable.

iv-a) The Engineer-in-Charge concerned shall have the right 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 reasons of non-fulfillment of the conditions of the contract for the benefit of the workers, non-payment of wages or of deduction made from his or their wages which are not justified by their terms of the contract or non-observance of the regulations.

iv-b) Under the provisions of the minimum wages (Central) Rules, 1950, the contractor is bound to allow to the labours directly or indirectly employed in the works one day's rest for six days continuous work and pay wages at the same rate as for duty. In the event of default, the Engineer-in-Charge shall have the right to deduct the sum or sums not paid on account of wages for weekly holiday to any labourer, and pay the same to the persons entitled thereto from any money due to the contractor by the Engineer-in-Charge.

v) The contractor shall comply with the provisions of the payment of wages Act 1936, Minimum Wages Act, 1948, Employees Liability Act, 1938, Workmen's Compensation Act, 1923, Industrial Disputes Act, 1947, Maternity Benefit Act, 1961 and the Contractor's Labour (Regulation and Abolition) Act, 1970 or the modifications thereof or any other laws relating thereto and the rules made there under from time to time.

vi) The contractor shall indemnify Government against payments to be made under and for the observance of the laws aforesaid and the D.A.E. Contractor's Labour Regulations without prejudice to his right to claim indemnity from his sub-contractors.

vii) The regulations aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this contract.

viii) Whatever is the minimum wages for the time being, or the wage payable is higher than such wages, such wage shall be paid by the contractor to the workman directly without the intervention of Jamadar and that Jamadar shall not be entitle to deduct or recover any amount from the minimum wage payable to the workman as and by way of commission or otherwise.

ix) The contractor shall ensure that no amount by way of commission or otherwise is deducted or recovered by the Jamadar from the wage of workman.

CLAUSE - 19B (1) : Additional Liabilities if any in complying with the provisions of clause 19 (B) (i) to (ix) shall be entirely to the contractor's account.

CLAUSE-19C : SAFTY PROVISIONS FOR LABOUR & PENALTY ON DEFAULT

In respect of all labour directly or indirectly employed in the work for the performance of the contractors part of this agreement, the contractor shall at his own expense arrange for the safety provisions as per DAE safety code framed from time to time and shall at his own expense provide for all facilities in connection therewith. In case the contractor fails to make arrangements and provide necessary facilities as aforesaid, he shall be liable to pay a penalty of Rs. 200/- for each default and in addition the Engineer-in-Charge shall be at liberty to make arrangement and provide facilities as aforesaid and recover the costs incurred in that behalf from the contractor.

CLAUSE 19D :

The contractor shall submit, by the 4th and 19th of 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 respectively.

1. The number of labourers employed by him on the work.

2. Their working hours.

3. The wages paid to them.

4. 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

5. The number of female workers who have been allowed Maternity Benefit, according to clause 19 F and the amount paid to them.

Failing which the contractor shall be liable to pay to Government a sum not exceeding Rs. 200/- for each default or materially incorrect statement.

The decision of the Engineer-in-Charge shall be final in deducting from any bill due to the contractor the amount levied as fine and be binding on the contractor.

CLAUSE 19E: HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS

In respect of all labour directly or indirectly employed in the works for the performance of the contractors part of this agreement, the contractor shall comply with or cause to be complied with all the rules framed by Government from time to time for the protection of health and sanitary arrangements for workers employed by the Department of Atomic Energy and its contractors.

CLAUSE 19F : Leave and pay during leave shall be regulated as follows:

1) **LEAVE**

i) In case of delivery : maternity leave not exceeding 8 weeks, 4 weeks upto and including the day of delivery and 4 weeks following that day.

ii) In the case of miscarriage : upto 3 weeks from the date of miscarriage.

2) **PAY**

i) In the case of delivery : leave pay during maternity leave will be at the rate of the women's average daily earnings, calculated on the total wages earned on the days when full time work was done during a period of 3 months immediately preceding the date on which she gives notice that she expects to be confined or at the rate of Rs. - only a day whichever is greater.

ii) In case of miscarriage : leave pay at the rate of average daily earnings calculated on the total wages earned on the days when full time work was done during a period of 3 months immediately preceding the date of such miscarriage.

3) **CONDITIONS FOR THE GRANT OF MATERNITY LEAVE**

No maternity leave benefit shall be admissible to a woman unless she has been employed for a total period of not less than 6 (six) months immediately preceding the date on which she proceeds on leave.

4) The contractor shall maintain a register of maternity (Benefit) in the prescribed form as shown below and the same shall be kept at the place of work.

REGISTER OF MATERNITY BENEFITS
(Clause 19 F of the conditions of contract)

Name and address of the contractor(s):_____

Name and location of the work: _____

Name of the employee	Father's / Husband Name	Nature of employment	Period of actual appointment	Date on which notice of confinement given
1	2	3	4	5

Date of delivery / miscarriage	Date on which maternity leave commenced and ended			
	In case of Delivery		In case of Mis-carriage	
	Commenced	Ended	Commenced	Ended
6	7	8	9	10

Leave pay paid to the employee				Remarks
In case of Delivery		In case of Mis-carriage		
Rate of leave pay	Amount Paid	Rate of leave pay	Amount Paid	
11	12	13	14	15

SPECIMEN FORM OF THE REGISTER, REGARDING MATERNITY BENEFIT ADMISSIBLE TO THE CONTRACTOR'S LABOUR IN D.A.E. WORKS.

Name of the work :_____

Name of the contractor :_____

1. Name of the woman and her husband's Name :
2. Designation :
3. Date of appointment :
4. Date with months and years in which she is employed :
5. Date of discharge/dismissal, if any :
6. Date of production of certificates in respect of pregnancy :
7. Date on which the woman informs about the expected delivery:
8. Date of delivery/Miscarriage/death :
9. Date of production of certificate in respect of delivery/miscarriage :
10. Date with the amount of maternity/death benefit paid in advance of expected delivery:
11. Date with the amount of subsequent payment of maternity benefit :
12. Name of the person nominated by the woman to receive the payment of the maternity benefit after her death :
13. If the woman dies, the date of her death, the name of the person to whom maternity benefit amount was paid, the month thereof and the date of payment:
14. Signature of the contractor authenticating entries in the register :
15. Remarks column for the use of Inspecting Officer :

CLAUSE 19G :

In the event of the contractor(s) committing a default or breach of any of the provisions of the D.A.E. Contractor's Labour Regulations and Model Rules and provisions of Contract Labour (R&A) Act 1970,and Central Labour (R&A) Central Rules, 1971, for the protection of health and sanitary arrangements for the workers as amended from time to time or furnishing any information or submitting or filing any statement under the provisions of the above Regulations and Rules which is materially incorrect, he/they shall, without prejudice to any other liability, pay to the Government a sum not exceeding Rs. 200/- for every default, breach or furnishing, making, submitting, filling such materially incorrect statements and in the event of the contractor(s) defaulting continuously in this respect, the penalty may be enhanced to Rs. 200/- per day for each day of default subject to a maximum of 5% of the estimated cost of the work put to tender. The decision of the Engineer-in-Charge shall be final and binding on the parties.

Should it appear to the Engineer-in-Charge that the Contractor(s) is/are not properly observing and complying with the Model rules and the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 and the contract Labour (R&A) Central Rules 1971 for the protection of health and sanitary arrangements for work people employed by the contractor(s) (hereinafter referred as "the said Rules") the Engineer-in-Charge shall have power to give notice in writing to the contractor(s) requiring that the said Rules be complied with and the amenities prescribed therein be provided to the work-people with in a reasonable time to be specified in the notice. If the contractor(s) shall fail within the period specified in the notice to comply with and/or observe the said Rules and to provide the amenities to the work-people as aforesaid, the Engineer-in-Charge shall have the power to provide the amenities here-in-before mentioned at the cost of the contractor(s).

The contractor(s) shall erect, make and maintain at his/their own expense according and to approved standards all necessary huts and sanitary arrangements required for his/their work-people on the site in connection with the execution of the works, and if the same shall not have been erected or constructed, according to approved standards, the Engineer-in-Charge shall have power to give notice in writing to the contractor(s) requiring that the said huts and sanitary arrangements be remodeled and/or reconstructed according to approved standard, and if the contractor(s) shall fail to remodel or reconstruct such huts and sanitary arrangements according to approved standards within the period specified in the notice, the Engineer-in-Charge shall have the power to remodel or reconstruct such huts and sanitary arrangements according to approved standards at the cost of the contractor(s).

CLAUSE 19H:

The contractor(s) shall at his/their own cost provide his/their labour with a sufficient number of huts (hereinafter referred to as the "camp") of the following specifications on a suitable plot of land to be approved by the Engineer-in-Charge.

1. a) The minimum height of each hut at the eaves level shall be 2.10 m. and the floor area to be provided will be at the rate of 2.7 Sq.m. for each member of the worker's family staying with the labourer.

b) The contractor(s) shall in addition construct suitable cooking places having a minimum area of 1.80 m. x 1.50 m adjacent to the hut for each family.

c) The contractor(s) shall also construct temporary latrines and urinals for the use of the labourers each on the scale of not less than four per each one hundred of the total strength, separate latrines and urinals being provided for women.

d) The contractor(s) shall construct sufficient number of bathing and washing places, one unit for every 25 persons residing in the camp. These bathing and washing places shall be suitably screened.

2. a) All the huts shall have walls of sun-dried or burnt-bricks laid in mud mortar or other suitable local materials as may be approved by the Engineer-in-Charge. In case of sun dried bricks, the walls should be plastered with mud gobri on both sides. The floor may be katcha but plastered with mud gobri and shall be at least 15 cm. above the surrounding ground. The roofs shall be laid with thatch or any other materials as may be approved by the Engineer-in-Charge and the contractor shall ensure that throughout the period of their occupation the roofs remain water-tight.

b) The contractor(s) shall provide each hut with proper ventilation.

c) All doors, windows and ventilators shall be provided with suitable leaves for security purposes.

d) There shall be kept an open space of at least 7.2 m between the rows of huts which may be reduced to 6 m according to the availability of site with approval of the Engineer-in-Charge. Back to back construction will be allowed.

3. Water Supply : The contractor(s) shall provide adequate supply of water for the use of labourers. The provision shall not be less than 10 Ltrs. of pure and wholesome water per head per day for drinking purposes and 15 Ltrs. of clean water per head per day for bathing and washing purposes. Where piped water supply is available, supply shall be at stand posts and where the supply is from wells or rivers, tanks, which may be of metal or masonry, shall be provided. The contractor(s) shall also at his/their own cost make arrangements for laying pipe lines for water supply to his/their labour camp from the existing mains wherever available and shall pay all fees and charges therefore.

4. The site selected for the camp shall be high ground, removed from jungle.

5. Disposal of Excreta : The contractor(s) shall make necessary arrangements for the disposal of excreta from the latrines by trenching or incineration which shall be according to the requirements laid down by the Local Health Authorities. If trenching or incineration is not allowed, the contractor(s) shall make arrangements for the removal of the excreta through the Municipal Committee authority and inform it about the number of labourers employed so that arrangements may be made by such committee/authority for the removal of the excreta. All charges on this account shall be borne by the contractor and paid direct by him to the Municipality/authority. The contractor shall provide one sweeper for every 8 seats in case of dry system.

6. Drainage: The contractor(s) shall provide efficient arrangements for draining away sullage water so as to keep the camp neat and tidy.

7. The contractor(s) shall make necessary arrangements for keeping the camp area sufficiently lighted to avoid accidents to the workers.

8. Sanitation: The contractor(s) shall make arrangements for conservancy and sanitation in the labour camps according to the rules of the Local Public Health and Medical Authorities.

CLAUSE 19I :

The Engineer-in-Charge may require the contractor to dismiss or remove from the site of the work any person or persons in the contractors employ upon the work who may be incompetent or misconduct himself and the contractor shall forthwith comply with such requirements.

CLAUSE 19J :

It shall be the responsibility of the contractors to see that the building under construction is not occupied by anybody unauthorised during construction and to hand over to the Engineer-in-Charge vacant possession of complete building. If such building though completed, is occupied illegally, then the Engineer-in-Charge will have the option to refuse to accept the said building/buildings in that position and delay in acceptance on this account will be treated as delay in completion and for such delay levy upto 5% of tendered value of work may be imposed by the Chief Engineer/ Engineer-in-charge whose decision shall be final both with regard to the justification and quantum and be binding on the contractor.

However the Chief Engineer may require the contractor through a notice to remove the illegal occupation any time on or before construction and delivery.

CLAUSE 19K : EMPLOYMENT OF SKILLED/SEMI-SKILLED WORKERS.

The contractor shall, at all stages of work, deploy skilled/semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute/Industrial Training Institute/National Institute of construction Management and Research (NICMAR)/National Academy of Construction, CIDC or any similar reputed and recognized Institute managed/certified by State/Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled/ semi-skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer in charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-charge. Failure on the part of contractor to obtain approval of Engineer-in-charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs.100 per such tradesman per day. Decision of Engineer in Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding.

Provided always, that the provisions of this clause, shall not be applicable for works with estimated cost put to tender being less than Rs.5 Crores.

CLAUSE 20 : MINIMUM WAGES ACT TO BE COMPILED WITH:

The contractor shall comply with all the provisions of the Minimum Wages Act, 1948, Contract Labour (Regulation and Abolition) Act, 1970, and rules framed there under and other labour laws affecting contract labour that may be brought into force/ amended from time to time.

CLAUSE 21 : WORK NOT TO BE SUB-LET / ACTION IN CASE OF INSOLVANCY

The contract shall not be assigned or sub-let without the written approval of the Engineer-in-Charge. And if the contractor shall assign or sub-let his contract, or attempt to do so, or become insolvent or commence any insolvency proceedings or make any composition with his creditors or attempt to do so, or if any bribe, gratuity, gift, loan, perquisite, reward or advantage pecuniary or otherwise, shall either directly or indirectly, be given, promised or offered by the contractor, or any of his servants or agent to any public officer or person in the employ of Government in any way relating to his office or employment, or if any such officer or person shall become in any way directly or indirectly interested in the contract, the Engineer-in-Charge on behalf of the President of India shall have power to adopt the courses specified in Clause 3 hereof in the interest of Government and in the event of such courses being adopted the consequences specified in the said Clause 3 shall ensue.

CLAUSE 22 : SUM PAYABLE BY WAY OF COMPENSATION

All amount payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of Government without reference to the actual loss or damage sustained, and whether or not any damage shall have been sustained.

CLAUSE 23 : CHANGES IN FIRM'S CONSTITUTION TO BE INTIMATED

Where the contractor is a partnership firm, the previous approval in writing of the Engineer-in-Charge shall be obtained before any change is made in the constitution of the firm. Where the contractor is an individual or a Hindu undivided family business concern such approval as aforesaid shall likewise be obtained before the contractor enters into any partnership agreement where under the partnership firm would have the right to carry out the work hereby undertaken by the contractor. If previous approval as aforesaid is not obtained, the contract shall be deemed to have been assigned in contravention of Clause 21 hereof and the same action may be taken, and the same consequence shall ensue as provided in the said Clause 21.

CLAUSE 24: WORKS TO BE UNDER DIRECTION OF ENGINEER-IN-CHARGE

All works under the contract, shall be executed under the direction and subject to the approval in all respects of the Engineer-in-Charge who shall be entitled to direct at what point or points and in what manner they are to be commenced, and from time to time carried on.

CLAUSE 25 : SETTLEMENT OF DISPUTES & ARBITRATION

Except where otherwise provided in the contract, all questions and disputes relating to the meaning of the specifications, design, drawings and instructions here-in before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, 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 or the execution or failure to execute the same whether arising during the progress of the work or after the cancellation, termination, completion or abandonment thereof shall be dealt with as mentioned hereinafter :

i) If the contractor considers any work demanded of him to be outside the requirements of the contract, or disputes any drawings, record or decision given in writing by the Engineer-in-Charge on any matter in connection with or arising out of the contract or carrying out of the work, to be unacceptable, he shall promptly within 15 days request the Superintending Engineer in writing for written instruction or decision. Thereupon, the Superintending Engineer shall give his written instructions or decision within a period of one month from the receipt of the contractor's letter.

ii) If the Superintending Engineer fails to give his instructions or decision in writing within the aforesaid period or if the contractor is dissatisfied with the instructions or decision of the Superintending Engineer, the contractor may, within 15 days of the receipt of Superintending Engineer's decision, appeal to the Chief Engineer who shall afford an opportunity to the contractor to be heard, if the latter so desires, and to offer evidence in support of his appeal. The Chief Engineer shall give his decision within 30 days of receipt of contractor's appeal. If the contractor is dissatisfied with this decision, the contractor shall within a period of 30 days from receipt of the decision, give notice to the Chief Engineer for appointment of arbitrator failing which the said decision shall be final binding and conclusive and not referable to adjudication by the arbitrator.

iii) Except where the decision has become final, binding and conclusive in terms of Sub Para (i) above disputes or difference shall be referred for adjudication through arbitration by a sole arbitrator appointed by the Director, IGCAR / Secretary, DAE. If the arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever another sole arbitrator shall be appointed in the manner aforesaid. Such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor. It is a term of the contract that the party invoking arbitration shall give a list of disputes with amounts claimed in respect of each such dispute along with the notice for appointment of arbitrator and giving reference to the rejection by the Chief Engineer of the appeal.

It is also a term of this contract that no person other than a person appointed by such Director, IGCAR / Secretary, DAE, as aforesaid should act as arbitrator and if for any reason that is not possible, the matter shall not be referred to arbitration at all.

It is also a terms of the contract that if the contractor does not make any demand for appointment of arbitrator in respect of any claims in writing as aforesaid within

120 days of receiving the intimation from the Engineer-in-Charge that the final bill is ready for payment the claim of the contractor shall be deemed to have been waived and absolutely barred and the Government shall be discharged and released of all liabilities under the contract in respect of these claims.

The arbitration shall be conducted in accordance with the provisions of the Arbitration and Conciliation Act, 1996, (26 of 1996) or any statutory modifications 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 also term of this contract that the arbitrator shall adjudicate on only such disputes as are referred to him by the appointing authority and give separate award against each dispute and claim referred to him and in all cases where the total amount of the claims by any party exceeds Rs.1,00,000/- the arbitrator shall give reasons for the award.

It is also a term of the contract that if any fees are payable to the arbitrator, these shall be paid equally by both the parties.

It is also a term of the contract that the arbitrator shall be deemed to have entered on the reference on the date the issues notice to both the parties calling them to submit their statement of claims and counter statement of claims. The venue of the arbitration shall be such place as may be fixed by the arbitrator in his sole discretion. The fees, if any, of the arbitrator shall, if required to be paid before the award is made and published, be paid half and half by each of the parties. The cost of the reference and of the award (including the fees, if any, of the arbitrator) shall be in the discretion of the arbitrator who may direct to any by whom and in what manner, such costs or any part thereof shall be paid and fix or settle the amount of costs to be so paid.

CLAUSE 25A : NO ARBITRATION FOR DECISION ON SUB-STANDARD WORK - DELETED

CLAUSE 26 : CONTRACTOR TO INDEMNIFY GOVT. AGAINST PATENT RIGHTS

The contractor shall fully indemnify the President of India against any action, claim or proceeding relating to infringement or 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 made under an action brought against Government in respect of any such matters as aforesaid the contractor shall be immediately notified thereof and the contractor shall be at liberty, at his own expense, to settle any dispute or to conduct any litigation that may arise there from. Provided that the contractor shall not be liable to indemnify the President of India in the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Engineer-in-Charge in this behalf.

CLAUSE 27: LUMPSUM PROVISION IN TENDER:

When the estimate on which a tender is made include lump sums in respect of parts of the work the contractor shall be entitled to payment in respect of the items of work involved or the part of the work in question at the same rates, as are payable

under this contract for such item, or if the part of the work in question is not, in the opinion of the Engineer-in-charge payable of measurement, the Engineer-in-Charge may at his discretion pay the lump sum amount entered in the estimate, and the certificate in writing of the Engineer-in-Charge shall be final and conclusive against the contractor with regard to any sum or sums payable to him under the provisions of the clause.

CLAUSE 28: ACTION WHERE NO SPECIFICATIONS ARE SPECIFIED

In the case of any clause of work for which there is no such specification as referred to in Clause XI, such work shall be carried out in accordance with the Bureau of Indian Standard specification. In case there are no such specification in Bureau of Indian standards, the work shall be carried out as per manufacturer's specifications, if not available then as per District specification. In case there are no such specification as required above, the work shall be carried out in all respects in accord with the instructions and requirements of the Engineer-in-charge.

CLAUSE 29 : WITH HOLDING AND LIEN IN RESPECT OF AMOUNT DUE FROM CONTRACTOR

1) Whenever any claim or claims for payment of a sum of money arises out of or under the contract against the contractor, the Engineer-in-Charge of the Government shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from the security, if any deposited by the contractor and for the purpose aforesaid, the Engineer-in-Charge or the Government shall be entitled to withhold the security deposit, if any, furnished as the case may be and also have a lien over the same pending finalisation or adjudication of any such claim. In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the contractor, the Engineer-in-Charge or the Government shall be entitled to withhold and have a lien to retain to the extent of such claimed amount or amounts referred to above, from any sum or sums found payable or which at any time thereafter may become payable to the contractor under the same contract or any other contract with the Engineer-in-Charge or the Government or any contracting person through the Engineer-in-Charge pending finalisation or adjudication of any such claim.

   It is an agreed term of the contract that the sum of money so withheld or retained under the lien referred to above, by the Engineer-in-Charge or Government will be kept withheld or retained as such by the Engineer-in-Charge or Government till the claim arising out of or under the contract is determined by the Arbitrator, (if the contract is governed by the arbitration clause) by the competent court, as the case may be, and that the contractor will have no claim for interest or damages whatsoever on any account in respect of such withholding or retention under the lien referred to above and duly notified as such to the contractor. For the purpose of this clause, where the contractor is a partnership firm or a limited company, the Engineer-in-Charge or the Government shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/limited company as the case may be, whether in his individual capacity or otherwise.

2) Government shall have the right to cause an audit and technical examination of the works and the final bills of the contractor including all supporting vouchers, abstract,

etc. to be made after payment of the final bill and if as a result of such audit and technical examination, any sum found to have been over paid in respect of any work done by the contractor under the contract or any work claimed by him to have been done by him under the contract and found not to have been executed, the contractor shall be liable to refund the amount of over-payment and it shall be lawful for Government to recover the same from him in the manner prescribed in sub-clause (1) of this clause or in any other manner legally permissible, and if it is found that the contractor was paid less than what was due to him under the contract in respect of any work executed by him under it, the amount of such under-payment shall be duly paid by Government to the contractor.

Provided that Government shall neither be entitled to recover any sum over-paid, nor the contractor shall be entitled to payment of any sum paid short where such payment has been agreed upon between the Superintending Engineer or Executive Engineer on the one hand and the contractor on the other under any terms of the contract permitting payment for work after assessment by the Executive Engineer.

CLAUSE 29A : LIEN IN RESPECT OF CLAIMS IN OTHER CONTRACTS

Any sum of money due and payable to contractor (including the security deposit returnable to him) under the contract may be withheld or retained by way of lien by the Engineer-in-Charge or the Government or any other contracting person or persons through Engineer-in-Charge against any claim of the Engineer-in-Charge or Government or such other person or persons in respect of payment of a sum of money arising out of or under any other contract made by the contractor with the Engineer in-charge or the Government or with such other person or persons.

It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the Engineer-in-Charge or the Government will be kept withheld or retained as such by the Engineer-in-Charge or the Government or till his claim arising out of in the same contract or any other contract is either mutually settled or determined by the arbitration clause or by the competent court, as the case may be, and that the contractor shall have no claim for interest or damage whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the contractor.

CLAUSE 30 : EMPLOYMENT OF COAL MINING OR CONTROLLED AREA LABOUR NOT PERMISSIBLE - DELETED –

CLAUSE 31 : SUPPLY OF UNFILTERED WATER

The contractor(s) shall make his/their own arrangements to water required for the work and nothing extra will be paid for the same. This will be subject to the following conditions:

i) That the water used by the contractor(s) shall be fit for construction purposes to the satisfaction of the Engineer-in-charge.

ii) The Engineer-in-charge shall make alternative arrangements for supply of water at the risk and cost of contractor(s) if the arrangements made by the contractor(s) for procurement of water are in the opinion of the Engineer-in-charge, unsatisfactory.

CLAUSE 31 A : DEPARTMENTAL WATER SUPPLY, IF AVAILABLE

Water if available may be supplied to the contractor by the department subject the following conditions:-

i) The water charges shall be recovered as specified in special conditions.

ii) The contractor(s) shall make his/their own arrangement of water connection and laying of pipeline from existing main source of supply.

iii) The Department do not guarantee to maintain uninterrupted supply of water and it will be incumbent on the contractor(s) to make alternative arrangements for water at his/their own cost in the event of any temporary breakdown in the Government water main so that the progress of his/their work is not held up for want of water. No claim of damage or refund of water charges will be entertained on account of such breakdown.

CLAUSE 32 : ALTERNATE WATER ARRANGEMENT

i) Where there is no piped water supply arrangement and the water is taken by the contractor from the wells or hand pump constructed by the Government, no charge shall be recovered from the contractor on that account. The contractor shall, however, draw water at such hours of the day that it does not interfere with the normal use of which the hand pumps and wells are intended. He will also be responsible for all damage and abnormal repairs arising out of his use, the cost of which shall be recoverable from him. The Engineer-in-charge shall be the final authority to determine the cost recoverable from the contractor on this account and his decision shall be binding on the contractor.

ii) The contractor shall be allowed to construct temporary wells in Government land for taking water for construction purposes only after he has got permission of the Engineer-in-charge in writing. No charges shall be required to provide necessary safety arrangements to avoid any accidents or damage to adjacent buildings, roads and service lines. He shall be responsible for any accidents or damage caused due to contribution and subsequent maintenance of the wells and shall restore the ground to its original condition after the wells are dismantled on completion of the work.

CLAUSE 33 : RETURN OF SURPLUS MATERIALS

Not-withstanding anything contained to the contrary in any or all of the clauses of this contract, where any materials for the execution of the contract are procured with the assistance of Government either by issue from Government stocks or purchase made under orders or permits or licenses issued by Government, the contractor shall hold the said materials economically and solely for the purpose of the contract and not dispose of them without the permission of the Government and return, if required by the Engineer-in-Charge, all surplus or unserviceable materials that may be left with him after the completion of the contract or at its termination for any reason whatsoever on being paid or credited such price as the Engineer-in-Charge shall determine having due regard to the condition of the materials. The price allowed to the contractor however, shall not exceed the amount charged to him excluding the element of storage charges if any. The decision of the Engineer-

in-Charge shall be final and conclusive. In the event of breach of the aforesaid condition the contractor shall in addition to throwing himself open to action for contravention of the terms of the licenses or permit and/or for criminal breach of trust, be liable to Government for all moneys, advantages or profits resulting or which in the usual course would have resulted to him by reason of such breach.

CLAUSE 34 : HIRE OF PLANT AND MACHINERY - DELETED –

CLAUSE 35 : USE OF ASPHALTIC MATERIALS - DELETED –

CLAUSE 36 : EMPLOYMENT OF TECHNICAL STAFF AND EMPLOYEES

The contractor shall provide all necessary superintendence during execution of the work and as along thereafter as may be necessary for proper fulfilling of the obligations under the contract. The contractor shall immediately after receiving letter of acceptance of the tender and before commencement of the work, intimate in writing to the Engineer-in-Charge the name, qualifications, experience, age, address and other particulars along with certificates, of the principal technical representative to be in charge of the work and other technical representative(s) who will be supervising the work. Minimum requirement of such technical representative(s) and their qualifications and experience shall not be lower than as specified in Schedule “F”. The Engineer-in-Charge shall within 3 days of receipt of such communication intimate in writing his approval or otherwise of such a representative to the contractor. Any such approval may at any time be withdrawn and in case of such withdrawal, the contractor shall appoint another such representative according to the provisions of this Clause. Decision of the tender accepting authority shall be final and binding on the contractor in this respect. Such a principal technical representative and other technical representative(s) shall be appointed by the contractor soon after receipt of the approval from Engineer-in-Charge and shall be available at site before starting the work.

All the provisions applicable to the principal technical representative under the Clause will also be applicable to other technical representative(s). The principal technical representative and other technical representative(s) shall be present at the site of work for supervision at all times when any construction activity is in progress and also present himself/themselves, as required, to the Engineer-in-charge and/or his designated representative to other. Instructions given to the principal technical representative or other representative(s) shall be deemed to have the same force as if these have been given to the contractor. The principal technical representative and other technical representative(s) shall be actually available at site fully during all stages of execution of work, during recording/checking/test checking of measurements of works and whenever so required by the Engineer-in-charge and shall also note down instructions conveyed by the Engineer-in-charge designated representative(s) in the site order book and shall affix his/their signature in token of noting down the instructions and in token of acceptance of measurements/checked measurements/ test checked measurements. The representative(s) shall not look after any other work. Substitutes, duly approved by Engineer-in-charge of the work in similar manner as aforesaid shall be provided in event of absence of any of the representative(s) by more than two days.

If the Engineer-in-Charge, whose decision in this respect is final and binding on the contractor, is convinced that no such technical representative or agent is effectively appointed or is/are effectively attending of fulfilling the provision of this clause a recovery non refundable shall be effected from the contractor as specified in Schedule F and the decision of the Engineer-in-Charge as recorded in the site order book and measurement recorded in Measurement Books shall be final and binding on the contractor. Further if the contractor fails to appoint a suitable technical representative and if such appointed persons are not effectively present or are absent by more than two days without duly approved substitute or do not discharge their responsibilities satisfactorily, the Engineer-in-Charge shall have full powers to suspend the execution of the work until such date as a suitable other technical representative(s) is /are appointed and the contractor shall he held responsible for the delay so caused to the work. The contractor shall submit a certificate of employment of the technical representative along with every on account bill/final bill and shall produce evidence if at any time so required by the Engineer-in-Charge.

The contractor shall provide and employ on the site only such technical assistants as are skilled and experienced in their respective fields and such foremen and supervisory staff as are competent to give proper supervision to the work.

The contractor shall provide and employ skilled, semiskilled and unskilled as is necessary for proper and timely execution of the work.

The Engineer-in-Charge shall be at liberty to object to and require the contractor to remove from the works any person who in his opinion misconducts himself, or is incompetent or negligent in the performance of his duties or whose employment is otherwise considered by the Engineer-in-Charge to be undesirable. Such person shall not be employed again at works site without the written permission of the Engineer-in-Charge and the persons so removed shall be replaced as soon as possible by competent substitutes.

CLAUSE 37 : LEVY/TAXES PAYABLE BY CONTRACTOR

i) GST, Building and other Construction Workers Welfare Cess or any other tax, levy or Cess in respect of input for or output by this contract shall be payable by the contractor and Government shall not entertain any claim whatsoever in this respect except as provided under Clause 38.

ii) The contractor shall deposit royalty and obtain necessary permit for supply of the red bajri, stone, kankar, etc. from local authorities.

iii) If pursuant to or under any law, notification or order any royalty, cess or the like becomes payable by the Government of India and does not any time become payable by the contractor to the State Government, Local authorities in respect of any material used by the contractor in the works, then in such a case, it shall be lawful to the Government of India and it will have the right and be entitled to recover the amount paid in the circumstances as aforesaid from dues of the contractor.

CLAUSE 38: CONDITIONS FOR REIMBURSEMENT OF LEVY/TAXES IF LEVIED AFTER RECEIPT OF TENDERS

(i) All tendered rates shall be inclusive of any tax, levy or cess applicable on last stipulated date of receipt of tender including extension if any. No adjustment i.e increase or decrease shall be made for any variation in the rate of GST, Building and Other Construction Workers Welfare Cess or any tax, levy or cess applicable on inputs. However, effect of variation in rates of GST or Building and Other Construction Workers Welfare Cess or imposition or repeal of any other tax, levy or cess applicable on output of the works contract shall be adjusted on either side, increase or decrease. Provided for Building and Other Construction Workers Welfare Cess or any tax (other than GST), levy or cess varied or imposed after the last date of receipt of tender including extension if any, any increase shall be reimbursed to the contractor only if the contractor necessarily and properly pays such increased amount of taxes/levies/cess. Provided further that such adjustment including GST shall not be made in the extended period of contract for which the contractor alone is responsible for delay as determined by authority for extension of time under Clause 5 in Schedule F.

(ii) The contractor shall keep necessary books of accounts and other documents for the purpose of the condition as may be necessary and shall allow inspection of the same by a duly authorized representative of the Government and/or the Engineer-in-Charge and further shall furnish such other information/document as the Engineer-in-Charge may require from time to time.

(iii) The contractor shall within a period of 30 days of the imposition of any such further tax or levy pursuant to the Constitution (46^{th} Amendment) Act, 1982, give a written notice thereof to the Engineer-in-Charge that the same is given pursuant to this condition, together with all necessary information relating thereto.

CLAUSE 39: TERMINATION OF CONTRACT ON DEATH OF CONTRACTOR

Without prejudice to any of the rights or remedies under this contract, if the contractor dies, the Engineer-in-Charge on behalf of the President of India shall have the option of terminating the contract without compensation to the contractor.

CLAUSE 40 : IF RELATIVE WORKING IN DAE, THEN CONTRACTOR NOT ALLOWED TO TENDER:

The contractor shall not be permitted to tender for works in the Indira Gandhi Centre for Atomic Research, (Responsible for award and execution of contracts) in which his near relative is posted as AO/AAO or as an officer in any capacity between the grades of Engineer-in Charge to Assistant Engineer.(Both inclusive) (SO/C and above.) He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any gazetted officer in the Department of Atomic Energy. Any breach of this condition by the contractor would render him liable to be debarred from tendering in this Department.

NOTE : By the term 'near relative' is meant wife, husband, parents and grand parents, children and grand children, brothers and sisters, uncles, aunts and cousins and their corresponding in-laws.

CLAUSE 41 : NO GAZETTED ENGINEER TO WORK AS CONTRACTOR WITHIN ONE YEAR OF RETIREMENT.

No Engineer of gazetted rank or other gazetted officer employed in Engineering or administrative duties in an Engineering Department of the Government of India is

allowed to work as a contractor for a period of One year of his retirement from Government Service without the previous permission of Government of India. This contract is liable to be cancelled if either the contractor or any of his employees is found at any time to be such a person who had not obtained the permission of Government of India as aforesaid, before submission of the tender or engagement in the contractors service as the case may be.

CLAUSE 42: RETURN OF MATERIALS AND RECOVERY FOR EXCESS ISSUED

i) After completion of the work and also at any intermediate stage in the event of non reconciliation of materials issued, consumed and in balance – (see Clause 10), theoretical quantity of materials issued by the Government for use in the work shall be calculated on the basis and method given hereunder:

a) Quantity of cement and bitumen shall be calculated on the basis of quantity of cement and bitumen required for different items of work as shown in the Schedule of Rates mentioned in Schedule 'F'. In case any item is executed for which standard constants for the consumption of cement or bitumen are not available in the above mentioned schedule/statement or cannot be derived from the same shall be calculated on the basis of standard formula to be laid down by the Engineer-in-charge.

b) Theoretical quantity of steel reinforcement or structural steel sections shall be taken as the quantity required as per design or as authorized by Engineer-in charge, including authorized lappages, chairs etc. plus 3% wastage due to cutting into pieces, such theoretical quantity being determined and compared with the actual issues each diameter wise, section wise and category wise separately.

c) Theoretical quantity of G.I. & C.I. or other pipes, conduits, wires and cables, pig lead and G.I./M.S. sheets shall be taken as quantity actually required and measured plus 5% for wastage due to cutting into pieces (except in the case of G.I./M.S. sheets it shall be 10%), such determination & comparison being made diameter wise & categoriwise.

d) For any other material as per actual requirements.

ii) Over the theoretical quantities of materials so computed a variation shall be allowed as specified in Schedule 'F'. The difference in the net quantities of material actually issued to the contractor and the theoretical quantities including such authorized variation, if not returned by the contractor or if not fully reconciled to the satisfaction of the

Engineer-in-charge within fifteen days of the issue of written notice by the Engineer-in-charge to this effect shall be recovered at the rates specified in Schedule 'F' without prejudice to the provision of the relevant conditions regarding return of materials governing the contract. Decision of Engineer-in-charge in regard to theoretical

quantities of materials, which should have been actually used as per the Annexure of the standard schedule of rates and recovery at rates specified in Schedule 'F', shall be final & binding on the contractor.

For no scheduled items, the decision of the Superintending Engineer regarding theoretical quantities of materials which should have been actually used, shall be final and binding on the contractor.

iii) The said action under this clause is without prejudice to the right of the Government to take action against the contractor under any other conditions of contract for not doing the work according to the prescribed specifications.

CLAUSE 43 : COMPENSATION FOR DAMAGE TO WORKS DURING WAR LIKE SITUATIONS:

The work (whether fully constructed or not) and all materials, machines, tools and plants, scaffolding, temporary buildings and other things connected therewith shall be at the risk of the contractor until the work has been delivered to the Engineer-in-Charge and a certificate from him to that effect obtained. In the event of the work or any materials properly brought to the site for incorporation in the work being damaged or destroyed in consequence of hostilities or war like operations, the contractor shall, when ordered in writing by the Engineer-in-Charge, remove any debris from the site, collect and properly stack (or remove) in store all serviceable materials salvaged from the damaged work and shall be paid at the contract rates in accordance with the provision of this agreement for the work of clearing the site of debris, stacking or removal of serviceable materials and for the reconstruction of all works ordered by the Engineer-in-Charge, such payments being in addition to compensation up to the value of the work, originally executed before being damaged or destroyed and not paid for. In case of works damaged or destroyed but not already measured and paid for, the compensation shall be assessed by the Engineer-in-Charge up to Rs. 5,000/- and by the Chief Engineer for a higher amount. The contractor shall be paid for the damage/destruction suffered and for the restoring the materials at the rate based on the analysis of rates tendered for in accordance with the provisions of this agreement. The certificate of the Engineer-in-Charge regarding the quality and quantity of materials and the purpose for which they were collected shall be final and binding on all parties to this contract.

Provided always that no compensation shall be payable for any loss in consequence of hostilities or war-like operations (a) unless the contractor had taken all such precautions against Air Raid as are deemed necessary by the A.R.P. Officers or the Engineer-in-Charge, (b) for any materials etc. not on the site of the work or for any tools and plant, machinery, scaffolding, temporary buildings and other things not intended for the work. In the event of the contractor having to carry out reconstruction as aforesaid, he shall be allowed such extension of time for its completion as is considered reasonable by the Engineer-in-Charge.

CLAUSE 44 : APPRENTICES ACT - PROVISIONS TO BE COMPLIED WITH

The contractor shall comply with the provisions of the Apprentices Act, 1961 and the rules and orders issued there under from time to time. If he fails to do so, his failure will be a breach of the contract and the Chief Engineer may, in his discretion, cancel the

contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provisions of the said Act..

CLAUSE 45 : REFUND OF SECURITY DEPOSIT AFTER LABOUR CLEARANCE – DELETED

CLAUSE 46: CONTRACT LABOUR (REGULATION & ABOLITION) ACT

The Contractor shall also comply with the provisions of the contract labour (Regulation, and Abolition) Act, 1970 and the rules and orders there under from time to time.

ANNEXURE - I

Safety Code

i) Suitable scaffolds shall be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except in the case of short duration work which can be done safely from ladders. When a ladder is used, it shall be of rigid construction made either of good quality wood or steel. The steps shall have a minimum width of 450 mm and a maximum rise of 300 mm. Suitable hand holds of good quality wood or steel shall be provided and the ladder shall be given an inclination not steeper than 1/4 to 1 (1/4 horizontal and 1 vertical)

ii) Scaffolding or staging more than 3.6m, above the ground floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly bolted, braced or otherwise secured, at least 900mm, above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

iii) Working platforms, gangways and stairways shall be so constructed that they do not sag unduly or unequally and if the height of the platform, gangway or stairway is more than 3.6m. above ground level or floor level, they shall be closely boarded and shall have adequate width and suitably fenced as described in (ii) above.

iv) Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 900mm. Whenever there are open excavations in ground, they shall be fenced off by suitable railing and danger signals installed at night so as to prevent persons slipping into the excavations.

v) Safe means of access shall be provided to all working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 m. in length while the width between side rails in rung ladder shall in no case, be less than 290 mm for ladder up to and including 3 m. in length. For longer ladders this width shall be increased at least 20 mm. for each additional metre of length.

a) A sketch of the ladders and scaffolds proposed to be used shall be and approval of the Engineer obtained prior to construction.

vi) All personnel of the Contractor working within the plant site shall be provided with safety helmets. All welders shall wear welding goggles while doing welding work and all metal workers shall be provided with safety gloves. Persons employed on metal cutting and grinding shall wear safety glasses.

vii) Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public.

Excavation and Trenching :

viii) All trenches, **1.2 m or more in depth**, shall at all times be supplied with at least one ladder **for each 30 m in length** or fraction thereof. The ladder shall be extended from bottoms of the trench of at least 900mm. above the surface of the ground. Sides of trenches which are 1.5 m or more in depth shall be stepped back to give suitable slope or securely held by timber bracing so as to avoid the danger of sides collapsing. The excavated materials shall not be placed within 1.5 m of the edges of the trench or half of the depth of the trench whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or undercutting shall be done.

ix) The Contractor shall take all measures on the site of the work to project the public from accidents and shall be bound to bear the expenses of defence of every suit, action or other proceedings at law that may be brought by any persons for injury sustained owning to neglect of the above precautions and to pay such persons or which may with the consent of the Contractor, be paid to compromise any claim by any such person.

Demolition :

x) Before any demolition work is commenced and also during the process of the work :

a) All roads and open areas adjacent to the work site shall either be closed or suitably protected.

b) No electric cable or apparatus which is liable to be a source of danger, such a cable or apparatus used by the operator shall not remain electrically charged.

c) All practical steps shall be taken to prevent danger to persons employed from the risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.

xi) All necessary personal safety equipment as considered adequate by the Engineer should be kept available for the use of the person employed on the site and maintained in a condition suitable for immediate use, and the Contractor should take adequate steps to ensure proper use of equipment by those concerned.

a) Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective goggles.

b) Those engaged in white washing and mixing or stacking of cement bags or any material which is injurious to the eyes shall be provided with protective goggles.

c) Those engaged in Welding works shall be provided with welder's protective eyesight lids.

d) Stonebreakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

e) When workers are employed in sewers and manholes, which are in use, the Contractor shall ensure that the manhole covers are opened and are ventilated at least for an hour before the workers are allowed to get into manholes and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to the public.

f) The Contractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 are employed on the work of lead painting, the following precautions should be taken :

i) No paint contained lead or lead products shall be used except in the form of paste or readymade paint.

ii) Suitable face masks should be supplied for use by the worker when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.

iii) Overalls shall be supplied by the Contractor to the workmen and adequate facilities shall be provided to enable for working painters to wash during the cessation of work.

xii) When the work is done near any public place where there is risk of drowning, all necessary equipments should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

xiii) Use of hoisting machines and tackle including their attachments anchorage and supports shall conform to the following standards or conditions.

1. a) These shall be of good mechanical construction, sound material and adequate strength and free from patent defect and shall be kept in good repair and in good working order.

b) Every rope used in hoisting or lowering material or as means of suspension shall be of durable quality and adequate strength and free from patent defects.

2. Every crane driver or hoisting appliance operator shall be properly qualified and no person under the **age of 21 years** shall be in-charge of any hoisting machine including any scaffolding which or give signals to operator.

3. In case of every hoisting machine and of every chain ring hook, shackle and pulley block issued in hoisting or as means of suspension the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load. In case of a hoisting machine having a variable safe working load, each safe working load and the conditions under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.

4. In case of departmental machines, the safe working loadshall be notified by the Engineer. As regards Contractor's machines, the Contractor shall notify the safe working load of the machine to Engineer whenever he brings any machinery to site of work and get it verified by the Engineer concerned.

xiv) Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards, hoisting appliances should be provided with such means as will reduce to the minimum the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations, which are already energised, insulating mats, wearing apparel such as gloves, sleeves and boots as may be necessary, should be provided. The workers should not wear any rings, watches and carry keys or other materials, which are good conductors of electricity.

xv) All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.

xvi) These safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent place at work spot. The person responsible for compliance of the safety code shall be named therein by the contractor.

xvii) To ensure effective enforcement of the rules and regulations relating to safety precautions the arrangements made by the Contractor shall be open to inspection by the Labour Officer, Engineers of the Department or their representatives.

xviii) Not with standing the above clause from (i) to (xvii), there is nothing in these to exempt the Contractor from the operations of any other Act or Rule in force in the Republic of India.

WORKING AT HEIGHTS:

xix) During the erection of tall buildings, nylon nets at a height of 3 to 4 m. shall be provided to ensure safety of men if there is a fall from heights. In case of industrial buildings the height of which is in excess of 4 m a temporary strong net shall be provided below the roof, at a height of 3m to 4 m above the floor, over which workers are working.

ANNEXURE - II

Model rules for the protection of health and sanitary arrangement for workers employed by Central P.W.D. or its contractors

(Applicable to D.A.E. projects, Kalpakkam)

1. **Application :**

These rules shall apply to all buildings and construction work of D.A.E. Projects, Kalpakkam.

2. **Definitions :**

a) Work place means a place at which, at an average 50 workers are employed in connection with construction work.

b) Large work place means a place at which an average 500 or more workers are employed in connection with construction work.

3. **First-Aid :**

a) At every place, there shall be maintained in readily accessible place first aid appliance including and adequate supply of sterilized dressings and sterilized cotton wool. The appliance shall be kept in good order and in large work place they shall be placed under the charge of a responsible person who shall be readily available during working hours.

b) At large work place, where hospital facilities are not available within easy distance of the works, first aid posts shall be established and be run by a trained compounder.

c) Where large work places are remote from regular hospitals, an indoor ward shall be provided with one bed for every 250 employees.

d) Where large work places are situated in cities, towns in their suburbs and no beds are considered necessary owing to the proximity of city or town hospitals, suitable transport shall be provided to facilitate removal of urgent cases to the hospitals. At other work places, some conveyance facilities, such a car, shall be kept readily available to take injured person or persons suddenly taken ill to the nearest hospital.

4. **Drinking Water:**

a) In every work place, there shall be provided and maintained at suitable places, easily accessible to labour, a sufficient supply of cold water fit for drinking.

b) Where drinking water is obtained from an intermittent public water supply each work place shall be provided with storage where such drinking water shall be stored.

c) Every water supply of storage shall be at a distance of not less than 15m. from any latrine, drain or other source of pollution. Where water has to be drawn from an existing well, which is with in proximity of latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn from it for drinking. All such well shall be entirely closed in and be provided with a trap door, which shall be dust and waterproof.

d) A reliable pump shall be fitted to each covered well, the trap door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

5. **Washing and bathing place :**

a) Adequate washing and bathing places shall be provided, separately for men and women:

b) Such places shall be kept in clean and drained condition.

6. **Scale of accommodation in latrines and urinals :**

There shall be provided within the precincts of every work place, latrines and urinals in an accessible place, and the accommodation, separately for each of them shall not be less than the following scale :

No. of seats.

a) Where the number of persons does not exceed 50 - 2

b) Where the number of persons exceeds 50, but does not exceed 100 - 3

c) For every additional 100, 3/100 In particular cases, the Engineer shall have the powers to vary the scale where necessary.

7. **Latrines & urinals for women :**

If women are employed, separate latrines and urinals, screened from those for men and marked, in the vernacular in conspicuous letters ‘For Women Only’ shall be provided on the scale laid in Rule 6. Those for men shall be similarly marked ‘For Men Only’. A poster showing the figure of a man or a woman shall also be exhibited at the entrance of latrines for the respective sex. There shall be adequate supply of water close to the urinals and latrines.

8. **Latrines and Urinals:**

All latrines shall be provided with septic tanks or each pits in case of small units. All the latrines shall be kept in good sanitary condition.

9. **Construction of latrines :**

The inside walls shall be constructed of masonry or some suitable heat resisting non-absorbent materials and shall be Cement washed inside and outside at least once a year. The dates of Cement washing shall be noted in a register maintained for this purpose and kept available for inspection. Latrines will not be of a standard

lower than bore-hole system and should have thatched roofs.

10. Disposals of excreta:

Unless otherwise arranged for by the local sanitary authority, arrangements for proper disposal of excreta shall be made by septic tank or leach pit duly approved by the Engineer and in conformity with the requirements of local public health authorities.

11. Provision of shelter during rest:

At every work place there shall be provided free of cost, two suitable sheds, one for meals and the other for rest separately for men and women for the use of labour. The height of the shelter shall not be less than 3.5 from the floor level, to the lowest part of the roof. The sheds should be roofed with at least thatch and mud flooring will be provided with a dwarf wall around not less than 750mm. Sheds should be kept clean and the space should be on the basis of at least 0.50 square metre per head.

12. Creches :

a) At every work place, at which 50 or more women workers are ordinarily employed, there shall be provided two huts for the use of children under the age of 6 years belonging to such women, one hut shall be used for infants' games and play and the other as their bedroom. The huts shall not be constructed on a lower standard than the following.

i) thatched roofs,

ii) mud floors and walls,

iii) planks spread over the mud floor and covered with matting.

The huts shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the place clean. There shall be two Dais in attendance. Sanitary utensils shall be provided to the satisfaction of the Health Officer of the area concerned.

The use of the hut shall be restricted to children their attendants and mothers of the children.

b) Where the number of women workers is more than 25 but less than 50, the Contractor shall provide at least one hut and one Dai to look after the children of women workers.

c) The size of creche shall vary according to the number of women workers.

d) The creches or creche shall be properly maintained and necessary equipment like toys etc. shall be provided.

13. Canteen :

A cooked food canteen on a moderate scale shall be provided for the benefit of workers wherever it is considered expedient.

14. The above rules shall be incorporated in the contracts and in notices inviting tenders and shall form an integral part of the contract.

ANNEXURE - III

Central Public Works Department Contractor's Labour Regulations (Applicable to DAE Projects, Kalpakkam)

Short titles :

1. The regulations may be called the "Central Public Works Department Contractor's Labour Regulations" (as applied to contracts relating to DAE Projects, Kalpakkam).

2. Definitions in these regulations, unless otherwise expressed or indicated, the following words and expressions shall have the meaning hereby assigned to them respectively, that is to say:

i) 'Labour' means workers employed in DAE Projects, Kalpakkam by Contractor directly or indirectly through a sub-contractor or other persons or by an agent on his behalf on a monthly payment as defined by Ministry of Labour from time to time and will not include supervisory staff like Overseers, etc.

ii) 'Fair Wages' means wages whether for time or piece work notified at the time of inviting tenders for the work and where such wages have not been so notified, the Wages prescribed by the Central Public Works Department for the district in which the work is done/ it will be notified/prescribed by the C.P.W.D. in consultation with the Officer of the Industrial Relations Ministry located in the respective areas and will not be less than the minimum rates of wages fixed by the Government for that class of employees engaged on the same type for work in same area.

iii) Contractor' shall include every person whether a sub-contractor or headman or agent, employing labour on the work taken on contract.

iv) 'Wages' shall have the same meaning as defined in the payment of Wages Act and includes time and piece rate wages.

a) Normally working hours of an adult employee should not exceed 9 hours a day. The working day shall be so arranged that inclusive of interval for rest, if any, if shall not spread over more than 12 hours on any day.

b) When an adult worker is made to work for more than 9 hours on any day or for more than 48 hours in any week, he shall be paid overtime for the extra hours put in by him at double the ordinary rate of wages.

c) Every worker shall be given a paid weekly holiday normally on Sunday in accordance with the provision of the minimum wages (Central) Rules 1960 (as amended from time to time) irrespective of whether work is governed by the minimum wages Act or not.

However as the all inclusive minimum daily rate of wages fixed under the Notifications

of the Government of India, Ministry of Labour Employment and Rehabilitation dated 19-5-69 are inclusive of wages for the weekly day of rest the question of extra payment for the weekly holiday would not arise.

3. **Display of notice regarding wages etc.**

The Contractor shall :

a) Before he commences his work on contract display and correctly maintain and continue to display and correctly maintain in a clean and legible condition in conspicuous places on the work, notices in English and in the local Indian language spoken by the majority of the workers, giving the rate of wages which have been certified by the Engineer or Regional Labour Commissioner, as fair wages and the hours of work for which such wages are earned, and.

b) Send a copy of such notice to the certifying officer.

4. **Payment of Wages**

i) Wages due to every worker shall be paid to him direct.

ii) All wages shall be paid in current coin or currency or in both.

iii) Arrears claimed after 2 months after the completion of the work shall not be entertained.

5. **Fixation of Wages period :**

i) The Contractor shall fix the wages periods in respect of which the wages shall be payable.

ii) No Wage periods shall exceed one month.

iii) Wages of every worker employed on the contract shall be paid.

a) In case of establishments in which wage period is one week, within 3 days from the end of the wage period, and

b) In the case of the other establishments, before the expiry of the 7th day or 10th day from the end of the wage period, according as the number of workers employed in such establishment.

iv) When the employment of any workers is terminated by or on behalf of the Contractor, the wages earned by him shall be paid before the expiry of the day succeeding the one on which his employment is terminated.

v) All payment of wages shall be made on a working day except when the work is completed before the expiry of the wage period, in which case final payment shall be made within 48 hours of the last working work site and during the working time.

NOTE: The term 'Working day' means a day on which the work on which the

labour is employed is in progress.

6. **Wages Book & Wages Slips etc. :**

i) The Contractor shall maintain a wage book of each worker in such form as may be convenient at the place of work, but the same shall include the following particulars:

a) Name of the workers.

b) Rate of daily or monthly wages.

c) Nature of work on which employed.

d) Total number of days worked during each wage period.

e) Dates and periods for which worked over time.

f) Gross wages payable for the work during each wage period.

g) All deductions made from the wage with an indication in each case of the ground for which the deduction is made.

ii) Signature or thumb impression of the worker.

iii) The Contractor shall also issue a wage slip containing the aforesaid particulars to each worker employed by him on the work at least a day prior to the day of disbursement of wages.

iii) The Contractor shall issue an Employment Card in the prescribed Form III to each, worker on the day of work or entry into the employment. If the worker has already any such card with him from the previous employer the Contractor shall merely endorse the employment card with relevant entries. On termination of employment, the Employment Card shall again be endorsed by the Contractor and returned to the worker.

iv) The Contractor shall comply with the provisions of the Apprentices Act, 1961 and the Rules and Orders issued there under from time to time. If he fails to do so, his failure will be a breach of the Contract and the Engineer may, in his discretion, cancel the contract. The Contractor shall also be liable for any

pecuniary liability arising on account of any violation by him of the provisions of the Act.

7. **Register of unpaid wages** :

The Contractor shall maintain a Register of unpaid wages in such form as may be convenient at the place of work but the same shall include the following particulars.

a) Full particulars of the labourers whose wages have not been paid.

b) Reference number of the muster roll and wage register.

c) Rate of wages.

d) Wage period.

e) Total amount not paid.

f) Reasons for not making payment.

g) How the amount of unpaid wages was utilised.

h) Acquittance with dates.

8**.** **Register of accidents :**

The Contractor shall maintain a register of accidents in such form as may be convenient at the work place but the same shall include the following particulars.

a) Full particulars of the labourers who met with accident.

b) Rate of wages.

c) Sex.

d) Age.

e) Nature of accident and cause of accident.

f) Date and time of accident.

g) Date and time when admitted in hospital.

h) Date of discharge from the hospital.

i) Period of treatment and result of treatment.

j) Percentage of loss of earning capacity and disability as assessed by Medical Officer.

k) Claim required to be paid under Workmen's Compensation Act.

l) Date of payment of compensation.

m) Amount paid with details of the person to whom the same was paid.

n) Authority by whom the compensation was assessed.

o) Remarks

9. **Fines and deductions which may be made from wages :**

The wages of a worker shall be paid to him without any deductions of any kind except the following:

a) Fines.

b) Deductions for absence from duty i.e. from the place or the places whereby the terms of his employment he is required to work. The amount of deductions shall be in proportion to the period for which he was absent.

c) Deductions for damage to or loss of goods expressly entrusted to the employed person for custody or for loss of money or any other deduction which he is required to account, where such damage or loss is directly attributable to his neglect or default.

d) Deduction for recovery of advances or for adjustment of over payment of wages, advance granted shall be entered in a register.

e) i) Any other deduction which the Central Government may allow from time to time.

ii) No fine should be imposed on any worker in respect of such acts and omissions on his part as have been approved of by the Chief Labour Commissioner.

iii) No Fine shall be imposed on a worker and no deduction for damage or loss shall be made from his wages until the worker has been given an opportunity of showing cause against such fines or deduction.

iv) The total amount of fine which may be imposed in anyone wage period on a worker shall not exceed an amount equal to three paise in a rupee of the wages payable to him in respect of that wage period.

v) No fine imposed on any worker shall be recovered from him by instalment or after the expiry of sixty days from the date on which it was imposed.

vi) Every fine shall be deemed to have been imposed on the day of the act or omission in respect of which it was imposed.

10**.** **Register of fines etc. :**

i) The Contractor shall maintain a register of fines and register of deduction for damage or loss in Form No. I and II respectively which should be kept at the place of work.

ii) The Contractor shall maintain both in English and the local Indian language, a list approved by the Chief Labour Commissioner clearly stating the acts and omission for which penalty or fine may be imposed on a workman and display it in a good condition in a conspicuous place of the work.

11. **Presentation of Register :**

The wage book, the wage slips, the register of unpaid wages, the register of accidents the register of fines and deductions required to be maintained under these regulations shall be preserved for 12 months after the completion of contract and shall be made available for inspection by the Engineer, Labour Welfare Officer or any other officer authorised by the Ministry of W.H. & U. in this behalf.

12. **Power of Labour Officer to make investigations or Enquiry:**

The Labour Welfare Officer or any other person authorised by the Central Government on their behalf shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of the fair wage clauses and the provisions of these regulations. He shall investigate into any complaint regarding the default made by the Contractor or sub-contractor in regard of such provisions.

13. **Report of Labour Welfare Officer :**

The Labour Officer or other persons authorised as aforesaid shall submit a report of result of his investigation or enquiry to the Engineer concerned indicating the extent if any, to which the default has been committed with a notice that necessary deduction from the Contractor's bill be made and the wages and other dues be paid to the labourers concerned. In case, an appeal is made by the Contractor under Clause 14 of these regulations actual payment to labourers will be made by the Engineer after the Regional Labour Commissioner has given his decision on such appeal.

a) The Engineer shall arrange payments to the labourers concerned within 45 days from the receipt of the Report from the Labour Welfare Officer or the Regional Commissioner, as the case may be.

14**.** **Appeal against the decision of the Labour Welfare Officer :**

Any person aggrieved by the decision and recommendations of the Labour Welfare Officer or other person so authorised may appeal against such decision to the Regional Labour Commissioner concerned within 30 days from the date of decision, forwarding simultaneously a copy of his appeal to the Engineer concerned but subject to such appeal, the decision of the officer shall be final and binding upon the Contractor.

15**.** **Prohibition regarding representation through lawyer :**

i) A workman shall be entitled to be represented to any investigation or enquiry under these regulations by:

a) An officer of a Registered trade union of which he is a member.

b) An officer of a federation of trade unions to which the trade union referred to in Clause (a) is affiliated.

c) Where the employee is not a member of any registered trade union by an officer of a registered trade union connected with or by any other workman, employed in the industry in which the worker is employed.

ii) An employer shall be entitled to be represented in any investigation or enquiry under these regulations by:

a) An officer of an association of employers of which he is a member. .

b) An officer of federation of associations of employers of which the association referred to in Clause (a) is affiliated.

c) Where the employer is not a member of any association of employers or by an officer of association of employers connected with or by any industry in which the employer is engaged.

iii) No party shall be entitled to be represented by the legal practitioner in any investigation or enquiry under these regulations.

16. **Inspection of books and slips :**

The Contractor shall allow inspection of the wage books and the wage slips, the register of unpaid wages, the register of accident and the register of fines and deductions to any of his worker or to his agent at a convenient time and place after the notice is received or to the Labour Welfare Officer or any other person, authorised by the Central Government on his behalf.

17. **Submission of return :**

The Contractor shall submit periodical returns as may be specified from time to time.

18. **Amendments :**

The Central Government may from time to time add to or amend the regulations and on any Question as to the application interpretation or effect of those regulations the decision of the Chief Labour Commissioner to the Government of India or any other person authorised by the Central Government in that behalf shall be final.

CONTRACT LABOUR (REGULATION & ABOLITION ACT 1970) WELFARE AND HEALTH OF CONTRACT LABOUR

19. **First-aid facilities :-**

There shall be provided and maintained by the contractor so as to be readily accessible during all working hours a first-aid box equipped with the prescribed contents at every place where contract labour is employed by him.

20**.** **Liability of principal employer in certain cases :-**

(1) If any amenity required to be provided under Section 16, Section 17, Section 18, or Section 19 for the benefit of the contract labour employed in an

establishment is not provided by the contractor within the time prescribed therefor, such amenity shall be provided by the principal employer within such time as may be prescribed.

(2) All expenses incurred by the principal employer in providing the amenity may be recovered by the principal employer from the contractor either by deduction from any amount payable to the contractor under any contract or as a debt payable by the contractor.

NOTES : Sections. 20 & 21 -Obligation to provide amenities conferred under the Act to the workers is on the principal employer. Government will be responsible for enforcement

of those amenities where contractors engaged by it for executing its construction project fail to provide the amenities to its workers. Government failure to perform its obligation amounts to violation of Article 21 and workers can enforce their right by writ petition under Article 32.

THE TAMIL NADU CONTRACT LABOUR RULES, 1975 CHAPTER V
WELFARE AND HEALTH OF CONTRACT LABOUR FIRST AID FACILITIES

21. In every establishment coming within the scope of the Act there shall be provided and maintained so as to be readily accessible during all working hours first-aid boxes at the rate of not less than one box per contract labour or part thereof ordinarily employed.

22. (1) The first-aid box shall be distinctively marked with a red cross on a white ground and shall contain the following equipment, namely: -

A. For establishment in which the number of contract labour employed does not exceed fifty each first-aid box shall contain the following equipment: -

(i) 6 small sterilized dressings.

(ii) 3 medium sterilized dressings.

(iii) 3 large size sterilized dressings.

(iv) 3 large size sterilized burn dressings.

(v) One (30 ml.) bottle containing solvolatile having the dose and mode of administration indicated on the label.

(vi) 1 (30 ml.) bottle containing a two percent alcohol solution of iodine.

(vii) 1 snake-bite lancet.

(viii) 1 (30 gms.) bottle of potassium permanganate crystals.

(ix) 1 pair of scissors.

(x) 1 copy of the first-aid leaflet issued by the Director-General, Factory Advice Service and Labour Institutes, Government of India.

(xi) A bottle containing 100 tablets (each of 5 grains) of aspirin.

(xii) Ointment for burns.

(xiii) A bottle of suitable surgical anti-septic solution.

(xiv) Eye drops.

(xv) Six roller bandages of 10 cm. wide.

(xvi) Six roller bandages of 5 cm. wide.

(xvii) Six triangular bandages.

B. For establishments in which the number of contract labour exceeds fifty each first-aid box shall contain the following equipments, namely :-

(i) 12 small sterilized dressings.

(ii) 6 medium size sterilized dressings.

(iii) 6 large size sterilized dressings.

(iv) 6 large size sterilized burn dressings.

(v) 6 (15 gms.) packets sterilized cotton wool.

(vi) 1 (60 ml.) bottle containing solvolatile having the dose and mode of administration indicated on label.

(vii) 1 (60 mi.) bottle containing a two percent alcoholic solution of iodine.

(viii) 1 roll of adhesive plaster.

(ix) A snake-bite lancet.

(x) 1 (60 gms.) bottle of potassium permanganate crystals.

(xi) 1 pair of scissors.

(xii) Copy of the first-aid leaflet issued by the Director-General, Factory Advice Service and Labour Institutes, Government of India.

(xiii) A bottle containing 100 tablets (each of 5 grains) of aspirin.

(xiv) Ointment for burns.

(xv) A bottle of a suitable surgical anti-septic solution.

(xvi) Eye drops.

(xvii) Twelve roller bandages of 10 cm. wide.

(xviii) Twelve roller bandages of 5 cm. wide.

(xix) Six triangular bandages.

(2) Adequate arrangement shall be made for immediate recoupment of the equipment when necessary.

23. Nothing except the prescribed contents shall be kept in the First-Aid Box.

24. The First-Aid Box shall be kept in charge of a responsible person who shall always be readily available during the working hours of the establishment.

25. A person in charge of the First-Aid Box shall be a person trained in First-Aid treatment, in establishments where the number of contract labour employed is 50 or more.

FORM - I

REGISTER OF FINES (REGULATION 10 (i) Employer)

Sl. No.	Name	Father's Husband's Name	Sex	Department	Nature & date of the offence	Whether worker showed cause against fine or not; if so, enter date	Rate of wages	Date and amount of fine imposed	Date on which fine realised	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

FORM - IIRegister of deductions for damages or loss caused to the employer by the neglect or default of the employed persons

(Regulation 10 (i) employer)

Sl. No.	Name	Father's Husband's Name	Sex	Department	Damage or loss caused with date	Whether worker showed cause against deductions if so, enter date	Date and amount of fine imposed	Number of instalments if any	Date on which amount of deduction imposed	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

FORM - III

Employment Card (Regulation 6 (iii))

Name and sex of the worker: Age or date of birth :

Father's Name : Address:

Identification :

Particulars of next of kin (wife and children, if any or dependent, next of kin in case the worker has no wife or child) :-

Name :

Full address of dependent :

(Specify Village, District and State)

Serial No.	Name and Address of employer (specify whether a contractor or sub-contractor)		Particulars of location of worksite and description of work done	Total period for which the worker is employed (from..... to.....)	Actual number of days worked	Leave taken (No. of days should be specified
(1)	(2)		(3)	(4)	(5)	(6)
Back side on the card						
Sl. No. as on reverse	Nature of work done by the worker	Wage Period	Wage rate (with particulars of unit in case of piece work)	Total wage earned by the worker during the period shown under column 5	Remarks	Signature of the Employer
(7)	(8)	(9)	(10)	(11)	(12)	(13)

N.B. - If the worker is employed both on piece and the wage rates, relevant entries in each case should be made separately

FORM - IV

ATTENDANCE CUM WAGE CARDS

CARD No………………… Date ……..........……….

Name of the Contractor………………………………………………………………………………….

Name of the work………………………………………………………………………………………..

Address………………………………………………………………………………………………… …….

Designation ……………….....…….....…… Rate of wages……………….........…………….

Date	Attendance	Signature of person making attendance	Remarks

On the Reverse of the Card

Wage period	Date on which over time worked	Gross Wages payable	Deduction if any	Actual wages paid	Date of Payment	Signature of the worker

FORM - VII & VIII

Maternity Benefits (Regulations 19F (3))

Name of the employee	Father's Husband's Name	Name of employment	Periods of actual appointment	Date on which notice of confinement given	Date of delivery miscarriage	Date on which maternity leave commenced and ended				In case of delivery leave paid to employee		In case of miscarriage leave paid to employee		Remarks
						In case of delivery		In case of miscarriage		Rate of leave pay	Amount Paid	Rate of leave pay	Amount Paid	
						Commenced Ended	Ended	Commenced Ended	Ended					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)

Specimen form of the Register regarding Maternity benefit admissible to Contractors' Labour in D.A.E. Projects Kalpakkam.

Name of work
Name of the contractor

1. **Name of the woman and her husband's name**
2. **Designation**
3. **Date of appointment**
4. **Date with months and year in which she is employed**
5. **Date of discharge/dismissal, if any**
6. **Date of production of certificate in respect of pregnancy**
7. **Date on which the woman informs about the expected delivery**
8. **Date of delivery/miscarriage/death**
9. **Date of production of certificate in respect of delivery/miscarriage**
10. **Date with the amount of maternity death, benefit paid in advance of expected delivery**
11. **Date with the amount of subsequent payment of maternity benefit**
12. **Name of the person nominated by the woman to receive the payment of the maternity benefit after her death**
13. **If woman dies, the date of her death, the name of person to whom maternity benefit amount was paid, the month thereof and the date of payment.**
14. **Signature of the contractor authenticating entries in the register.**
15. **Remarks column for the use of Inspecting Officer**

SECTION – V

SPECIFIC REQUIREMENTS AND SCOPE OF WORK

1. Scope :

This specification covers the Contract for Periodic preventive maintenance of Electrical power distribution, Motor control centre (MCC) & blower motors, Furnace equipments with control panel and various electrical works in the PPRDF at MC&MFCG, IGCAR, Kalpakkam, as detailed in the schedule of quantities and subsequent sections of technical specifications hereunder and also as per the General tender specification. The work in the tender broadly covers the following:

- Maintenance of PCC, MCC, VTPN DB, TPN DB, TPN switches and Power distribution boards.
- Maintenance of Heater control panel, Motor control panel and Starter panel.
- Maintenance of 3 phase Induction motors.
- Maintenance of Plate and Rod earth electrodes.
- Maintenance of ECR, Tape, Cord, Kanthal heater and Thermocouple assembly.
- Testing of VFD and PLC.
- Supply installation testing and commissioning of LED Light fittings.

2. Location and Climatic Conditions:

The Project site is located 80 Km from Chennai. The site is accessible by Road from Chennai via. Chengalpattu, Thirukkazhukundram and also via.Mamallapuram. The Contractor may note the severe climatic condition existing in the region with co-incident humidity, salt laden atmosphere and high temperature conducive to rust and fungus growth.

a. Ambient Air Temperature : 45 Deg. C.
b. Installation location : Indoor / Out door
c. Power supplies at site : i) 415 V, 3 Phase, 4 wire, 50 Hz, Effectively Grounded.
ii) 240 V, 50Hz , 1 Phase AC.

3. Time Schedule :

Total time allowed for the entire work will be **Twenty four Months**.

The contractor shall plan various activities to ensure the strict adherence to the time schedule and as per the priorities to be decided by the Engineer-in-charge. Time is the essence of the contract. The contractor shall take into account security, safety and quality requirements of IGCAR and shall plan the work for timely completion.

4 DEVIATION:

Deviations contemplated by the Tenderer, if any, from these specifications shall be spelt out clause wise, clearly in the offer.

Wherever deviations are not clearly brought out/mentioned it will be deemed that the offered equipment will fully comply with the equipment specification irrespective of whether the literature enclosed with the offer agrees or not.

5. GENERAL:

5.1 List of Supervisor and Technicians to be employed for this work with the copies of Diploma/ITI Certificate, Supervisor's Competency Certificate, Wiremen License with details of their relevant experience shall be furnished for reference and records of the Engineer-in-Charge.

5.2 All safety precautions shall be taken while at work. Experienced Wiremen holding valid Wireman/Electrician License shall only be employed as required. License of the Wireman/Electrician to be employed in this Contract shall be produced to the Engineer-in-Charge before signing the Contract Agreement. If the Contractor fails to meet the above requirement, the Department is entitled to terminate the Contract.

5.3 Site Engineer/Supervisor of the Contractor shall meet the Engineer-in-Charge on all working days and finalise the work to be executed on each day with the approval of the Engineer-in-Charge. He shall be present at the work spot during the working hours.

5.4 The Contractor will finalize the work programme well in advance in consultation with the Engineer-in-Charge. Details of Cables laid every day shall be submitted to the Engineer-in-Charge, in the approved format positively the next working day.

5.5 The Contractor shall follow strictly the Government Labour Acts, which are in force at present and all necessary arrangements/amenities/facilities for the labour employed by him shall be made/provided by the Contractor.

5.6 The Contractor shall follow strictly all the Safety Rules/Procedures/Codes of the Department in practice and also follow the security rules of the Department regarding issue of Identity Cards, etc. as may be framed from time to time by the Department.

5.7 The Contractor shall take suitable Insurance Policy for his/their labour employed by him for this contract covering the Accident Benefit Clause/Medical Claim. Such Insurance Policy shall be produced by the Contractor before signing the Contract Agreement failing which the Department is entitled to terminate the contract.

5.8 The Contractor shall employ Security Personnel at his own cost to protect the equipment and all materials/installations until the entire work is completed and handed over to the Department.

5.9 The Contractor shall note that no construction activity will normally be allowed at Site on Sundays and all Government Holidays. However, if required by the Engineer-in-Charge, to expedite the completion of specific work, as it may arise from time to time, special permission shall be obtained to work on such days at the discretion of the Engineer-in-Charge.

5.10 The contractor shall provide sufficient number of tools and machineries for the execution of the work. List of such items available with the contractor shall be furnished along with the offer.

5.11 Each of the Contractor's workmen shall wear the Identity Cards issued to them conspicuously.

5.12 Only genuine materials of the approved make listed under the preferred make of materials shall be supplied. Before effecting bulk supply, sample of each item shall be submitted for approval of Engineer-in-Charge. If necessary, Engineer-in-Charge or his authorized representative will visit the manufacturer's works for witnessing the tests on the items to be supplied under this Contract to ensure that the items conform to and meet the intent of the specification. The Engineer-in-Charge reserves the right to waive off pre-dispatch inspection of any or all the items covered under this contract at his discretion. It is responsibility of the Contractor to supply items conforming to the tender specifications and also arrange and organise such tests with the manufacturer. The Contractor shall also be responsible to ensure that the items are conforming to the specifications before delivering at site.

5.13 Catalogues, Instructions for installation and maintenance - containing part number, specifications, Guarantee/Warranty Certificate supplied by the manufacturer along with Control/Switchgear and other items shall be handed over to the Department as and when the materials are delivered at Site. Removed items/components shall be transported and returned to the Department as directed by the Engineer-in-Charge through proper documentation.

5.14 The contractor shall engage qualified persons to execute the work. The following is the minimum qualification required.

- Supervisor: Diploma in Electrical Engineering having 5 Years experience preferably in Electrical Maintenance of LT panels, Heaters, Motors, PLC control panel.

- Technician (Skilled): "ITI Certificate" holder in Electrical trade with "B License" and having 4 Years experience in Electrical Maintenance of LT panels, Heaters, Motors, Starter control panel.

5.15 All the formats for Forms required for furnishing/compilation of data or test results by the Contractor will be furnished to the Contractor as and when required by the Engineer-in-Charge and the Contractor shall print and supply these forms at no extra cost in sheets or as a bound volume as desired by the Engineer-in-Charge.

5.16 The Contractor shall make suitable arrangements/provide communication devices to enable the Engineer-in-Charge or his authorized representative to contact his Supervisor / Engineer at any time during the day.

5.17 The contractor shall verify and ensure the credentials of the personnel employed by them that they have clean past records, and have no connection with any undesirable organization in the national interest. In case of any complaint against any contractor personnel he shall be removed from DAE Complex with immediate effect.

5.18 While carrying out any construction or installation work inside any premises the contractor shall ensure that his staff do not cause any inconvenience to the occupants and shall carry out the work with minimum noise if it is unavoidable. Any garbage, debris, dust, dirt generated during the work shall be totally removed and the area thoroughly cleaned to the satisfaction of the occupant.

5.19 The contractor shall strictly adhere to all safety rules including ensuring that the circuit/feeder on which the work is to be carried out is totally isolated and grounded before taking up the work. The work shall be well coordinated from the planning stage onwards until the completion of the work and re-energising the feeder with the Engineer-in-Charge.

5.20 The contractor shall get the approval for samples of all components from the Engineer-in-Charge prior to purchasing the item in bulk.

6. QUALITY CONTROL, PRE-DISPATCH INSPECTION AND TESTING OF MATERIAL RECEIVED AT SITE:

6.1 All the fabricated Items covered by this specification to be supplied by the Contractor/manufacturer shall be offered for Pre-despatch inspection to the Engineer-in-Charge or his authorised representative. Items/Components found unsatisfactory as to workmanship shall be removed by the Contractor and replaced at no extra cost with Items/Components which are satisfactory.

6.2 All the custom made items / components covered in this specification to be supplied by the Contractor shall be despatched only after obtaining the written shipping release from the Engineer-in-Charge. Waiving off pre-despatch inspection or acceptance of the items by the quality surveyor shall not relieve the Contractor / Manufacturer from the responsibility of furnishing the items and workmanship in accordance with this specification. Sample items shall be brought for acceptance of EIC. Upon approval and shipping release, bulk purchase shall be effected by contractor. Delivery challan and invoice shall accompany the material, failing which no payment will be made.

6.3 The representative of the Engineer-in-Charge shall have at all reasonable times access to the Supplier's or Sub-Supplier's works for the purpose of witnessing the tests and to ascertain that the items being manufactured conforms to the requirements of this specification. The Engineer-in-Charge shall be given at least 10 days advance notice, in general, prior to the commencement of testing so that the representative of the Engineer-in-Charge can plan to visit and witness the tests. All the tests indicated in the test clause of this specification shall be carried out in the presence of the representative of the Engineer-in-Charge by the manufacturer and shall provide all the facilities & equipment for testing. Three copies of the Test Certificate / Report shall be furnished to the Engineer-in-Charge for approval prior to despatch of items from the works.

6.4 The Contractor and Manufacturer of the equipment shall carry out the checks as per the Check List which will be provided by the Engineer-in-Charge on approval of Drawings and confirm the compliance to the Check-List prior to issue of Inspection Call.

6.5 All the LED fixtures shall be painted with order no and date as directed by EIC.

7. PACKING, DELIVERY, UNLOADING AND STORING:

7.1 Contractor shall prepare all equipment covered by this specification for transport in such a manner as to protect it from damage in transit & ingress of water and shall be responsible to make good at his own expense any and all damage due to improper packing. The contents shall be identified on the package. The packing shall be marked with lifting & hook-up points for unloading.

7.2 The Contractor shall make his own arrangements for the transportation, unloading and safe storage of materials at Site at no extra cost.

8. FACILITIES PROVIDED BY THE DEPARTMENT:

Power supply and water supply will be provided by the Department at free of cost.

9. COMPLETION CERTIFICATE AND MAINTENANCE GUARANTEE

After the completion of the installation and testing, the contractor should furnish a certificate in the proforma provided the Department at the time of taking over the installation. The installation shall be guaranteed for a period of 12 months from the date of taking over by the Department. During the period of guarantee all defects in material or in workmanship, shall be rectified or replaced free of cost to the Department. The contractor shall give guarantee certificate upon completion of work.

10. Scope and Description of Work

The items of the work covered in the schedule of quantities are described hereunder. All the materials required for the work except specifically brought out as Departmental issue shall be supplied by the Contractor. The work shall be carried out meeting the requirements in this section and general specifications of this tender.

11. (Schedule item reference No:3)

Maintenance of LT 415 Volt Heater Control Panel as per the detailed specification.

a. Scope of work involves preventive and breakdown maintenance of Heater control panel.
b. Physical inspection on the equipment under maintenance is to be carried out and if any abnormality is seen, the same has to be intimated to the Engineer-in-charge immediately.
c. The panel shall be cleaned thoroughly by using blower / waste cloth / cleaning agent etc. and all accumulated dust particles shall be removed. All the required cleaning materials such as Waste cloths, CTC/ Equivalent, Lubrication Oil shall be arranged by the contractor at their own cost.
d. Tightness of all power and control cables shall be checked and loose connections if any shall be tightened.
e. In case of failure of any components such as contactor, SSR, Relay, Controller, MCB, fuse, indication lamp, terminal connectors etc it shall be replaced. Required components / accessories will be issued by the department.
f. Control and Power cable rerouting and dressing in the cable tray as directed by EIC.
g. Control panel inside wiring dressing.
h. Testing of earth continuity to be checked.
i. Necessary tests / insulation resistance tests shall be conducted as directed by the EIC before & after the maintenance and the results shall be recorded & submitted to the EIC.

12. (Schedule item reference No.4)

Maintenance of LT 415 Volt Starter Control Panel as per the detailed specification.

a. Scope of work involves preventive and breakdown maintenance of Starter control panel.
b. Physical inspection on the equipment under maintenance is to be carried out and if any abnormality is seen, the same has to be intimated to the Engineer-in-charge immediately.
c. The panel shall be cleaned thoroughly by using blower / waste cloth / cleaning agent etc. and all accumulated dust particles shall be removed. All the required cleaning materials such as Waste cloths, CTC/ Equivalent, Lubrication Oil shall be arranged by the contractor at their own cost.
d. Tightness of all power and control cables shall be checked and loose connections if any shall be tightened.
e. In case of failure of any components such as contactor, relay, MCB, fuse, terminal connector, indication lamp etc it shall be replaced. Required components / accessories will be issued by the department.
f. Cleaning of power contactors for removal of oxides on the surface of contacts with smooth cloth and CTC/ equivalent.
g. Testing of earth continuity to be checked.
h. Necessary tests / insulation resistance tests shall be conducted as directed by the EIC before & after the maintenance and the results shall be recorded & submitted to the EIC.

13. (Schedule item reference No.7)

Preventive and Breakdown maintenance of ECR/TAPE/CORD heaters upto 3kW for salt heating vessel and pipeline as per the detailed specification.

a. The scope of the work involves preventive and breakdown maintenance of salt heating vessel and pipeline heaters.
b. Removal of heater and thermocouple end wire connection.
c. Dismantling and removing of aluminium cladding and glass wool insulation over the pipe line and vessel.
d. Maintenance of faulty heaters and thermocouple as directed by EIC.
e. Reinstallation of aluminium cladding and glass wool insulation over the pipe line and vessel.
f. Heater and Thermocouple end wire reconnection.
g. Necessary tests / insulation resistance tests shall be conducted as directed by the EIC before & after the maintenance and the results shall be recorded & submitted to the EIC.
h. The contract personnel shall wear necessary personal protective equipment such as special gloves, mask etc.

14. (Schedule item reference No.11)

Surveillance and performance check of UPS system up to 10 kVA as per the detailed specification.

a. Visual inspection and cleaning of battery and UPS.
b. Tightness of UPS terminal connection.
c. Tightness of battery terminal connection.
d. Individual battery voltage & battery bank voltage to be checked and recorded, Faulty battery to be replaced.
e. Performance check of battery bank with existing load by Switching OFF mains power supply and record various electrical parameters (Battery voltage, discharge current, UPS output voltage, load current etc.) as per the given format during discharging.
f. Performance check of battery bank with existing load by Switching ON mains power supply and record various electrical parameters (Battery voltage, discharge current, UPS output voltage, load current etc.) as per the given format during charging.

15. (Schedule item reference No.13)

Testing of VFD range from 3.5 kw to 18.5 kw as per detailed specification.

a. Visual inspection and cleaning of VFD.
b. Tightness of VFD terminal connection.
c. Recording the VFD setting parameter.
d. Testing of VFD at various frequency setting.
e. Testing of VFD for Over load setting.

16. (Schedule item reference No.14)

Testing of PLC consisting of 12 nos. I/O Module as per detailed specification.

a. Visual inspection and cleaning of PLC CPU and I/O Modules.
b. Tightness of PLC terminal connection.
c. Checking input display for input modules.
d. Checking output display for output modules.
e. Checking communication cable healthiness between PLC and SCADA.

17. **(Schedule item reference No.16)**
Supply and Installation of recess mounted LED light fitting of Philips make RC360LED 36S 6500K (36W) or equivalent as per detailed specification.

Supply and installation of 2" X 2" recess mounted LED Lights on false ceiling up to a height of 4.2 metre including wiring termination and testing. The Make of light fixture should be PHILIPS. Model of light fixtures is RC360LED 36S 6500K (36W) or equivalent**.**

18. **(Schedule item reference No.17)**
Supply and Installation of Philips make BVP175/100W Flood Light Fitting or equivalent as per detailed specification.
Supply and installation of flood light fitting of Phillips make BVP175/100W or equivalent above the containment box up to a height of 4.2 metre including wiring termination and testing**.** The light fitting should be fixed with MS frame bolt and nuts**.**

19. **(Schedule item reference No.18)**
Supply and Installation of Philips make BN021 LED 40W batten type LED light fitting or equivalent as per detailed specification.
Supply and installation of Philips make BN021 LED 40W batten type LED light fitting or equivalent in steel structure up to a height of 4.2 metre including wiring termination and testing. The light fitting to be fixed on the existing ball and socket**.**

20. **(Schedule item reference No.19)**
Supply and Installation of Philips BN308 LED20S 40W batten type LED light fitting or equivalent as per detailed specification.
Supply and Installation of Philips BN308 LED20S 40W batten type LED light fitting or equivalent in steel structure up to a height of 4.2 metre including wiring termination and testing. The light fitting to be fixed on the existing ball and socket.

21. Terms & Conditions of the Maintenance Contract

Suitable manpower (qualified in the interview conducted by the Engineer in Charge) has to be provided by the Contractor without fail. The suitable least tools of 4 sets required for the preventive maintenance work has to be provided by the Contractor. And also, he has to provide safety wear items for the working personnel-Manpower under his maintenance contract.

I. To execute the above works it is mandatory to provide minimum of 3 persons of manpower for 450 working days with a combination of 2 semi-skilled(Minimum ITI qualified or Minimum 5 years' experience in electrical maintenance)and 1skilled (minimum 10 year experience in electrical maintenance / DEEE qualified) electrical technicians.
II. The contractor has to provide man power continuously so that department work shall not suffer.
III. All the raw materials, tools and consumables required for the work will be under the scope of contractor and no material will be issued free of cost.
IV. The normal working hours of the labours (minimum 8 hrs per day) will be 09.00 to 17.30 hrs and contractor has to confirm the attendance of the manpower. If required the contractors have to come in the Round The Clock duty as per the Engineer In Charge instruction.
V. The contractor has to maintain a separate log book for the day to day work of the maintenance / preventive maintenance & installation works etc.
VI. The contractor has to credit the government approved minimum wages to their employee's bank account on or before 7th day of every month.
VII. Contractor has to assign their manpower to attend any breakdown or emergency works during holidays and beyond regular working hours on working days.

VIII. Please refer Section VI (MNC) for further details about Man power allocation.

22. Important Instructions:

Contractors are advised to purchase the following materials only from the manufacturers or their dealers to avoid inferior quality and the contractor shall furnish the invoice while bringing the materials for the work. The documents as well as the materials will be subjected to check before using the material for work.

1. 1000 V Insulation Tester (Megger)
2. 1000 V continuity tester (Multimeter)
3. 230 V, 50 Hz soldering Iron
4. Tools and spanner sets.
5. Connecting materials and electrical consumables.

23. Special Instruction to Tenderers:

a. Cost evaluation will be done based on the overall cost only and not based on individual item.
b. The bidders who have quoted for all items only will be considered for evaluation.
c. The contractor shall make his own arrangement for providing all facilities like accommodation, boarding & lodging, transport to site etc. for his employees.
d. Contractor workers shall follow the working hours of plant and they shall report every day to the Engineer-in-charges for his instructions.
e. Only authorized routes shall be used for entering into the premises. The rates quoted by the contractor will not be governed by escalation clause and shall remain firm throughout the contract period.
f. In case the job is not completed within the stipulated time period for any reason falling in the scope of contractor necessary penalty as per clause of general condition of contract shall be imposed.
g. Contractor has to follow strictly the labour acts, which are in force from time to time. Any payment required to be made as per rules and regulations by Contractor to his workman shall be come by the Contractor compensation policy.
h. Any damage /breakage of IGCAR equipment due to working of contract workers shall be made good by the contractor at his own cost. Any damage caused to any of the IGCAR material /equipment/tools while in the custody of the Contractor or otherwise shall be made good by him at his own cost.
i. Contractor shall not assign or sublet the job without the written approval of the Engineer-in-charge.
j. Tenderers shall furnish full information to prove their competence to handle this nature of work, which have proven to be satisfactory, in operation, otherwise tenders will likely to be rejected.
k. The contractor shall make arrangements for inspection of materials along with the required manpower to conduct the inspection / testing both at site and at works where other components required for the equipment that are manufactured.
l. The work has to be carried out as outlined in technical specifications in Section – I to VI and the annexure which are mandatory.
m. The contractor shall ensure that the work is completed in the stipulated time & accordingly he shall make a time schedule and deploy the required manpower and other sources.
n. Apart from Special Instructions to tenderers mentioned on part-I General conditions applicable to all IGCAR between special and general conditions the special conditions /instructions of contract will govern.

o. The Engineer-in-charge reserves the right to delete any portions of the work before or after the contract is awarded or accept all or portions of the bids.

p. The contractor shall comply with all statutory requirements such as insurance Coverage, workmen's compensation so as to absolve IGCAR of any and all liabilities in case of accidents. Contractor shall produce to IGCAR within 15 days from the date of work order, the insurance Policy covering the workmen as per relevant Act.

q. The respective rights, privileges duties and obligations of IGCAR and the contractor under this award of contract shall be governed / determined by the laws of the State of Tamilnadu.

r. Cost of damages caused due to bad workmanship shall be recovered from the contractor.

s. Engineer-in-charge will have the right to withdraw the work permit for any of the contract workmen for reasons of misconduct, violations of safety and Fire Rules etc,

t. The contractor shall take full responsibilities on the character and qualities of the workers/employees engaged by them

u. The contractor has to take insurance coverage for the workers engaged by them.

v. Tenderer to note that tenders with any conditions including that of conditional rebate shall be rejected fore with.

SECTION VI

GENERAL SPECIFICATION AND REQUIREMENTS FOR ELECTRICAL WORKS

CONTENTS

Abbreviations

ASTM	American Society for Testing and Materials standards
C	Commissioning
CBIP	Central Board of Irrigation and Power
CFL	Compact Fluorescent Lamp
DB	Distribution Box
DMC	Dough Moulding Compound
EIC	Engineer in charge
ELCB	Earth Leakage Circuit Breaker
EP	Embedded Plate
ERW	Electric Resistance Welding
ETP	Electrolytic Tough Pitch
FRLS	Fire Retardant Low Smoke
FRP	Fibre Reinforced Plastic
GI	Galvanized Iron
HDPE	High Density Poly Ethylene
HF	High Frequency
HP	Horse Power
HRPVC	Heat Retardant Poly Vinyl Chloride
HT	High tension (voltages above 1100V)
I	Installation
IE Rules	Indian Electricity Rules 1956 and its latest amendments
IEC	International Electro-technical Commission
IEE	Institution of Electrical Engineers
IP	Ingress Protection
IR	Insulation Resistance
IS	Indian Standards
ISO	International Organization for Standardization
JB	Junction Box
LAN	Local Area Network
LDR	Light Dependant Resistor

LED	Light Emitting Diode
LT	Low tension (voltages up to 1100V)
MCB	Miniature Circuit Breaker
MCCB	Moulded Case Circuit Breaker
MS	Mild steel
NB	Nominal Bore
Nos.	Numbers
OD	Outer Diameter
OEM	Original Equipment Manufacturer
PCC	Plain Cement Concrete
PIJF	Polythene Insulated Jelly Filled
PIR	Passive Infrared
PTL	Post Top Lantern
PU	Poly Urethane
RCC	Reinforced Cement Concrete
RCCB	Residual Current Circuit Breaker
RPM	Revolutions Per Minute
S	Supply
SITC	Supply, Installation, Testing & Commissioning
SDFU	Switch Disconnector Fuse Unit
SFU	Switch Fuse Unit
SLD	Single Line Diagram
SMC	Sheet Moulding Compound
SOQ	Schedule of Quantities
SS	Stainless Steel
T	Testing
THD	Total Harmonic Distortion
UG	Underground
VTPN DB	Vertical Three Phase Neutral Distribution Box
XLPE	Cross Linked Polyethylene

GENERAL SPECIFICATION AND REQUIREMENTS FOR ELECTRICAL WORKS

1 General

Order of Specifications

These specifications relate to the electrical works carried out at Indira Gandhi Centre for Atomic Research and General Services Organisation, Kalpakkam and are the general requirements to be full filled. These specifications (Section – VI) refer to the schedule items unless otherwise specified in the specific requirements (Section – V) of this tender document. Section VI of this document can either be this document or Section VI (Maintenance Works). The term Section VI refers to either of them or both as the case may be.

In case of conflict between contents of Section-V and Section-VI of this tender document, the contents of Section-V shall govern unless otherwise specified.

Applicable Rules and Regulations

Installation shall be carried out in conformity with the regulations for electrical equipments of buildings, published by the Institute of Electrical Engineers, London (13th Edition 1955 and as amended upto date) hereinafter referred to as the IEE wiring regulations. Where these specifications or the special specifications for the particular building attached hereto are at variance with the IEE regulations, these specifications or specific requirements as the case may be, shall be followed. The installation shall also comply with the requirements of the CEA regulations for measures relating to safety and electrical supply as amended up to date and rules issued there under. Where not specified otherwise, the installation should generally follow the Indian Standard Codes of Practice. All the materials shall comply with the relevant Indian Standard or British Standard Specifications.

Definitions

The definition of Terms in the IEE regulations shall apply in general, except the definition for point wiring which shall be as in ***Clause 17.6.***

2 Earth Work Excavation

The scope of work includes Earth work excavation in all types of soil including hard murram. Rocks are not likely to be encountered to the depths in which excavation is intended. In the unlikely event of encountering soft/hard rock during the excavation no separate payment will be made. If necessary an alternate route can be considered with the approval of Engineer-in-Charge.

The excavation of trenches shall be made in all types of soil including soft / hard rocks encountered in the excavation, cutting and clearing of plants, bushes and shrubs in the cable route, shoring, and disposal of soil as directed by Engineer-in-Charge.

The unit rate quoted for Earthwork excavation shall include the cost of labour for excavation of trench and cutting and clearing of plants, bushes and shrubs in the route and protecting other existing properties if exposed, refilling and disposing of surplus earth with in 20Mtr, after laying the cable as directed by the Engineer-in-Charge.

Adequate care shall be taken so as not to damage existing services while excavating. Bricks and slabs of such laid cables if encountered shall be carefully stacked nearby and after completion of other works, the existing cables shall be neatly dressed, provided with fresh

river sand bed and the removed bricks and slabs shall be replaced. Extra Bricks required if any, for the covering of the other existing service lines shall be provided at no extra cost. Disturbance to any other system shall be rectified as directed by the Engineer-in-Charge.

While excavating the trenches, precaution shall be taken to avoid damages to other service pipe lines other cables etc laid already along the same route. If any existing services are damaged by the contractor, it is his responsibility to rectify the same at no extra cost as per the direction of Engineer in charge.

All excavation work shall be inspected and approved by the Engineer-in-Charge before any further work in excavated areas is allowed to commence.

After obtaining the approval of site Engineer, the excavated area shall be back-filled and the soil shall be consolidated to the original level of the ground by watering and levelling. Surplus earth shall be disposed with in a lead of 20 Mtrs as directed by the Engineer-in-Charge. The excavated trench while refilling it is advisable to leave a crown of earth not less than 150 mm in the centre and tapering towards the sides of the trench. This allows for subsidence. However the crown of earth should not exceed 200 mm.

Earth Excavation in Anupuram Township: All the conditions in ***Clause 2.1.1 to 2.1.7*** regarding earth work excavation is applicable for this item except that the soil is comparatively harder during dry seasons.

3 S,I,T,C of LT / HT/ Control / Telephone Cables

Guidelines for safe handling of cable drums:

This guidelines shall be followed wherever the cable drums are handled.

Loading and unloading of the drum shall be done by crane only.

As soon as the cables are received at site, the cable drums shall be checked for any physical damage and also cable end seals shall be checked for its proper condition and in position, by the Engineer-in-charge or his representative along with the contractor or his site supervisor.

The cable drum shall be rolled only in the direction of painted arrow on the drum and only for short distances.

The pair of jacks with stand and shaft shall be used for mounting the cable drum. The jacks shall be positioned on hard and flat surface

While laying of cable from the drum supported on jacks, the drum shall be rotated in the same direction as that of the arrow marked on the drum flanges.

The cable end shall be pulled out from the top side of the drum and never from the bottom side of the drum.

Installation of cables direct in ground

The scope of work involves loading, transportation, unloading at site, supply of brick, slab, river sand, installation, testing and commissioning of various sizes and voltages of Power/ PIJF Telephone/ control cables. Necessary lifting cranes and trailers for loading, unloading and transportation of the cable drums will be in the scope of contractor. After laying the cable, the steel cable drums/wooden cable drums shall be returned to the storage area of drums. In case of free issue of cable, the cables will be available in IGCAR / GSO central store, transportation of cables from there to site where it is to be laid, is part of this item.

The total quantity of cable given in schedule may not change. But, the quantity may vary between (Cable laying direct in ground) and (cable laying in built-in trench) according to site conditions.

The cable sizes for measurement purpose are grouped as below:

a) Cable size up to 25 Sq.mm
b) Cable Size exceeding 25 Sq.mm cable but not exceeding 120 Sq.mm
c) Cable Size exceeding 120 Sq.mm cable but not exceeding 240 Sq.mm
d) Cable Size exceeding 240 Sq.mm cable but not exceeding 400Sq.mm
e) Up to 20 Pair Telephone cable
f) Above 20 Pair but not exceeding 50 Pair
g) Above 50 Pair but not exceeding 200 Pair
h) Up to 14C x 2.5 sq mm control cables.
i) Above 14C x 2.5 sq mm but not exceeding 37C x 2.5 sq mm control cables.

Earth excavation required for cable laying shall be started only after the arrival of bricks, river sand, cable drum jacks, cable rollers etc. at site. The approved make of bricks are SNB, EBW, PGK.

The excavation shall be made as per ***Clause*** **2** with sufficient width and depth. The depth of excavation shall be as specified in Table 1.

Before filling the river sand bed, the bottom of the trench shall be carefully levelled and shall be free from stones, pebbles etc. having sharp edges. If gradients and changes of depth are unavoidable, they should be gradual.

River sand shall be filled up for 75 mm height at the bottom of earth excavated trench.

The cables shall be laid over the river sand using suitable rollers with enough care to avoid damage to the cables. Cable jacks for handling the drum and cable rollers shall be arranged by the contractor. The same shall be issued from department based on availability.

The cables shall be provided with protective covering using chamber burnt / fly-ash bricks on sides. Country bricks as well as broken bricks shall not be permitted.

Each cable shall be laid separately. Adjacent cables/feeders can share a common side brick.

After placing the cables and side bricks, fill up the remaining areas between the bricks with river sand.

In case of LT / Control / Telephone cables, the cables shall be covered with brick on top. The cables shall be laid as per Drawing No. IGC/ESD/5072/2001/1.

In case of HT cables exceeding 1100V, the cables shall be covered with PCC Slabs of 300 x 300 x 50 mm size. The Plain Cement Concrete shall be of 1:2:4 mix, using hard broken granite stones of size 20 mm. The slabs shall be cast at the site and cured for a minimum period of 21 days or as directed by the Engineer-in-Charge. The cables shall be laid as per Drawing. No. IGC/ESD/5074/5001/1.

The insulation resistance of all the cables shall be tested prior to commencement of installation in the presence of the Engineer-in-Charge or his authorised representative. The IR values shall be recorded and a copy of the same shall be handed over to the Department.

After the cables have been laid and before the trench is back-filled the location of cable and joints shall be noted down, to be marked in as-built Drawing.

After obtaining the approval of Engineer-in-Charge, the excavated trench shall be refilled and it is advisable to leave a crown of earth not less than 150 mm in the centre and tapering towards the sides of the trench. This allows for subsidence. The crown of earth should not exceed, however 200 mm.

Cable ends shall never be left open and shall be sealed by using heat shrinkable end caps.

NOTE: Rate quoted shall also include suitable size Raychem/3M make heat shrinkable end sealing caps. In case the cable end is to be left opened for more days in outdoor environment cable ends shall be sealed with end caps so as to avoid ingress of moisture.

It is in the scope of contract that the cables laid shall be identified with plastic labels, tied with plastic twine over the individual cables at every 10 Meters furnishing the VOLTAGE, SIZE, SOURCE OF SUPPLY and EQUIPMENT CONNECTED/ DESTINATION as per the direction of Engineer-in-charge.

RCC cable route marker of size 750 x 320 x 60mm (Refer Drawing No. IGC/ESD/5072/2001/1 for LT / control / telephone cables and IGC/ESD/5074/5001/1 for HT cables) shall be provided along the route of the underground cables, with inscription at an interval of every 50 Metres in straight line of cable route for all the Cables (Runs) laid together and wherever the route changes its direction. In case of cables on straight road edges the spacing between the route markers can be increased as decided by the EIC. Supply and installation of cable marker (Route indicator) will not be measured separately.

After the completion of work in each area the contractor shall prepare cable route layout with distances marked from reference points identified by the EIC. The final drawings shall be submitted in 3 Nos. of hard copy and 1 No. soft copy in non erasable disc.

The Unit rate quoted shall also be inclusive of supply & installation of cable route marker, cable identification tags, bricks/slabs, river sand, end sealing caps and all other consumable items, tools etc. required for the satisfactory completion of the job.

Table 1

Description of cables	Depth of excavation
LT / control cables up to 1100V	850 mm
HT cables above 1.1kV and up to 11kV	1075 mm
HT cables above 11kV and up to 33kV	1275 mm
Telephone cables	700 mm

Installation of cables in built-in trench

Loading, Transportation, Unloading at site, Installation, Testing and Commissioning of power cable of various voltage grades, control cable , telephone cable in Built in Trench

The scope of work includes Laying, Testing and Commissioning of various sizes and voltage grades of power cable/ PIJF telephone cable/control cable in built-in trenches, on walls, poles and through embedded pipes including supply of GI spacer, clamps etc.

The cables shall be installed in built-in trenches, on Brick/RCC walls, embedded pipes, Hume pipes provided at the road crossings with supply and fixing of clamps, sealing of cable entry openings etc. In built-in trenches, cables shall be installed on cable support / Racks. Cables shall enter trenches through sleeves provided at trench mouth.

Wherever cable is required to cross the brick wall, it shall be laid inside a GI pipe sleeve. The scope includes supply and installation of GI pipe sleeves of required size as directed by

the EIC. The pipes shall be placed vertical to the wall surface and in flush with the surface. The wall shall be drilled as per requirement and plastered back to a neat finish.

While installation of cables, care shall be taken to avoid bending beyond the minimum bending radius specified by OEM or calculated by 15 x OD.

LT / Control / Telephone Cables / HT cables of up to 185 Sq.mm: The cables shall be properly dressed and clamped by 25x3 mm GI clamps and 25x6mm GI spacers at 600 mm interval in the vertical run and 750 mm intervals in the horizontal run / based on the size of the cable as directed by the Engineer-in-Charge. Clamps and spacers shall be made of mild steel (MS) and hot dip galvanized after fabrication. All fixing fasteners shall be of GI.

HT Cables above 185 Sq.mm: For HT cables (exceeding 1100V), the cables shall be properly dressed and clamped by 50x3 mm GI clamps and 50x6mm GI spacers at 600 mm interval in the vertical run and 750 mm intervals in the horizontal run / based on the size of the cable as directed by the Engineer-in-Charge. Clamps and spacers shall be made of mild steel (MS) and hot dip galvanized after fabrication. All fixing fasteners shall be of GI.

Wherever cable passes through metallic / Hume pipes, after pulling through it, pipe ends shall be sealed with heat shrinkable sleeve (Raychem make-WRSM sleeve to suit the pipe size) / bitumen compound after tightly packing the cable in pipe by means of jute / gunny cloth.

It is in the scope of contract that the cables laid shall be identified with Plastic labels, tied with plastic twine over the individual cables at every 10 Meters furnishing the VOLTAGE, SIZE, SOURCE OF SUPPLY and EQUIPMENT CONNECTED/ DESTINATION as per the direction of Engineer-in-charge.

After the completion of work in each area the contractor shall prepare cable route layout with distances marked from reference points identified by the EIC. The final drawings shall be submitted in 3 Nos. of hard copy and 1 No. soft copy in non erasable disc.

All the material for the completion of work of laying, sealing and redressing of already laid cables (if disturbed) is also in the scope of this item.

Testing and Commissioning of Cables

The contractor shall carry out tests as specified by the Engineer- in- Charge to determine whether the work complies with the specifications.

Test Values/Data shall be recorded systematically and submitted to the Engineer-in-Charge.

The contractor shall arrange all the test equipment required for the completion of work

Following are the site Tests to be carried out:

a) IR value before and after laying.
b) IR value before and after termination.
c) Continuity Test.
d) Hipot Test (Only for HV cables) after completion of termination or jointing.
e) IR value before and after Hipot Test. (Only for HV cables)
f) Conductor Resistance Test.
g) Core Matching test

Technical specification for LV cables

Cable codes

The following table describes the codes of the cables used in the SOQ.

Code	Conductor	Insulation	Inner sheath	Armour	Outer sheath
A2XYWY	Aluminium	XLPE	PVC Type ST2	Wire	PVC Type ST2
A2XYWT	Aluminium	XLPE	PVC Type ST2	Wire	PVC Type ST2 with FRLSH
A2XYFY	Aluminium	XLPE	PVC Type ST2	Flat	PVC Type ST2
A2XYFT	Aluminium	XLPE	PVC Type ST2	Flat	PVC Type ST2 with FRLSH
AHYYWY	Aluminium	PVC Type C	PVC Type ST2	Wire	PVC Type ST2
AHYYWT	Aluminium	PVC Type C	PVC Type ST2	Wire	PVC Type ST2 with FRLSH
AHYYFY	Aluminium	PVC Type C	PVC Type ST2	Flat	PVC Type ST2
AHYYFT	Aluminium	PVC Type C	PVC Type ST2	Flat	PVC Type ST2 with FRLSH
AYYWY	Aluminium	PVC Type A	PVC Type ST1	Wire	PVC Type ST1
AYYWT	Aluminium	PVC Type A	PVC Type ST1	Wire	PVC Type ST1 with FRLSH
AYYFY	Aluminium	PVC Type A	PVC Type ST1	Flat	PVC Type ST1
AYYFT	Aluminium	PVC Type A	PVC Type ST1	Flat	PVC Type ST1 with FRLSH
-2XYWY	Copper	XLPE	PVC Type ST2	Wire	PVC Type ST2
-2XYWT	Copper	XLPE	PVC Type ST2	Wire	PVC Type ST2 with FRLSH
-2XYFY	Copper	XLPE	PVC Type ST2	Flat	PVC Type ST2
-2XYFT	Copper	XLPE	PVC Type ST2	Flat	PVC Type ST2 with FRLSH
-HYYWY	Copper	PVC Type C	PVC Type ST2	Wire	PVC Type ST2
-HYYWT	Copper	PVC Type C	PVC Type ST2	Wire	PVC Type ST2 with FRLSH
-HYYFY	Copper	PVC Type C	PVC Type ST2	Flat	PVC Type ST2
-HYYFT	Copper	PVC Type C	PVC Type ST2	Flat	PVC Type ST2 with FRLSH
-YYWY	Copper	PVC Type A	PVC Type ST1	Wire	PVC Type ST1
-YYWT	Copper	PVC Type A	PVC Type ST1	Wire	PVC Type ST1 with FRLSH
-YYFY	Copper	PVC Type A	PVC Type ST1	Flat	PVC Type ST1
-YYFT	Copper	PVC Type A	PVC Type ST1	Flat	PVC Type ST1 with FRLSH
-2XY-Y	Copper	XLPE	PVC Type ST2	Un-armoured	PVC Type ST2

Note: FRLSH – Fire retardant low smoke reduced halogen evolution – cables of improved fire performance – comes under Category C2 cables as per Indian Standards.

Standards

The cables covered by this specification unless otherwise stated, be designed in accordance with the latest editions of the following Indian standards.

IS: 7098	Specification for XLPE insulated, PVC sheathed electric cables
IS: 1554	Specification for PVC insulated (Heavy duty) electric cables
IS: 8130	Specification for Aluminium conductor for insulated cables
IS: 5831	Specification for PVC insulation and sheath of electric cables
IS: 3975	Specification for Armour of electrical cables
IS: 10418	Specification for packing and marking

Embossing on the outer sheath of the cable

The following shall be embossed on the outer sheath throughout the length of the cable.

a) Cable code (as per IS)
b) Type of cable and voltage grade
c) Number of cores
d) Size of conductor in Sq.mm.
e) Sequential marking of running metre length
f) Name of the Manufacturer
g) Year of manufacture
h) DAE/IGCAR (in case length of cable supplied is more than 3km)

Packing and marking on the drum

The cable shall be wound on wooden drums of suitable size, packed and marked as per IS 10418.The outer ends of the cable shall be sealed by means of non- hygroscopic sealing material.

GTP – Guaranteed Technical particulars

The contractor on award of contract shall make necessary field measurements and arrive at the quantity of cable required for the work and order the same in advance. GTP for the cable to be supplied by the contractor shall be submitted to EIC for approval and manufacturing clearance.

Tests

All the routine and acceptance tests specified in the respective Indian Standards (IS) shall be carried out. Sampling plan for acceptance test shall be as per IS. If necessary repeated tests shall be carried out by the manufacturer in the presence of purchaser's representative. If the cable fails to pass the specified tests, the purchaser shall have the option to reject it.

In case of length of cable supplied is more than 3 km, type tests specified in respective IS shall be carried out on the cable. The purchaser at his option may waive all or any of the type tests provided type test certificates carried out essentially identical cables are furnished by the Manufacturer.

In case of FRLS outer sheath cables, the special tests for "Category C2 – fire performance improved cables" specified in IS shall be carried out in addition to other tests. The purchaser may select the different samples from the lot for conducting these tests.

4 HDPE Pipes & Cable laying in HDPE pipes

Specification for supply of HDPE pipe and accessories

PLB HDPE Duct

a) Permanently Lubricated HDPE Duct of 40mm/33 mm size conforming to the specifications as per BSNL standard TEC GR No. TEC/GR/TX/CDS-008/03/MAR-11 with latest Amendments.
b) Internal and external surface of the pipes shall be smooth, clean and free from groove and other defects.
c) HDPE Pipes shall be manufactured from virgin raw materials under strict quality control. HDPE Pipes shall have excellent corrosive resistance, chemically inert and unaffected by bacteria. HDPE Pipes shall be leak-free and High Ductility and Resilience.

Push fit Coupler

Push Fit couplers shall be used for coupling PLB HDPE ducts/coils. The specifications of the couplers shall be as per TEC GR no TEC/GR/TX/CDS-008/03/Mar11 with latest amendment.

PP Rope

PP Rope shall confirm to TEC GR No. TEC/GR/TX/CDS-008/03/MAR-11 with latest Amendments. The PP rope can be ordered along with the PLB duct as required. In this case PP rope is drawn through the HDPE/PLB pipes/coils and safely tied to the end caps at either ends with hooks to facilitate pulling of the cables at a later stage. The duct shall be supplied with pre-installed rope. The rope shall be polypropylene, 4 mm in diameter for 40mm/33mm ducts and confirm to IS: 5175, with a minimum slackness of 2%.

End Cap

End Cap shall be used for sealing the ends of the empty ducts, prior to installation of the Cable and shall be fitted immediately after laying the duct to prevent the entry of any dirt, water, moisture, insects/rodents etc. It should confirm to TEC GR No. TEC/GR/TX/CDS-008/03/MAR-11 with latest amendments. The End Caps used should be suitable for closing 40mm/33mm PLB HDPE ducts/coils. A suitable arrangement should be provided in the End Cap to tie PP Rope.

Cable sealing Plug

This shall be used to seal the end of the ducts perfectly, after the cable is pulled in the duct. The ends of the PLB HDPE ducts/coils are closed with Cable sealing Plugs. The End Plugs used should be suitable for closing 40mm/33mm PLB HDPE ducts/coils. The Cable sealing plug shall confirm to TEC GR No. TEC/GR/TX/CDS-008/03/MAR-11 with latest amendments.

Installation of HDPE pipes and accessories direct in ground

The contractor, on issue of work order shall make necessary field measurements to arrive at the actual length of various sizes of HDPE pipes and accessories required for the completion of the work and get it approved by the Engineer-in-Charge prior to finalization of drum lengths and placement of order.

The trench of sufficient width shall be excavated by the contractor as detailed in ***Clause* 2** of this specification.

PLB HDPE pipes shall be laid directly in the ground without any extra protection at a depth of 800 mm from the normal ground level.

In case of joints both ends of the pipe shall be brought above the ground till the joint is over. The scope includes jointing of HDPE pipes as per site requirement using push fit coupler.

Plastic tag shall be provided as detailed in ***Clause 3.2.19*** of this specification.

Installation of HDPE pipes and accessories in built-in trench

Wherever the HDPE pipes laid on built-in trenches / walls/ slab /open trenches the pipe shall be clamped with suitable size of GI Clamp and Spacer at every 1000mm intervals. The cost for supply and installation of 25x3mm GI clamp and 25 x 6mm GI spacer and fixing fasteners are included in the scope of work.

Wherever HDPE Pipes passes through GI/Hume pipes, after pulling through it, pipe ends shall be sealed with bitumen compound after tightly packing the pipes by means of jute/gunny cloth.

All the material for the completion of work of laying, sealing and redressing of already laid cables (if disturbed) is also in the scope of this item.

Embedment of HDPE pipes with accessories

The pipe shall be embedded with required accessories on floor, slab, etc. The pipe shall be laid in the rubble stone filling below RCC slab as directed by the EIC.

Laying of cables through HDPE pipes

The cables shall be laid in already installed HDPE pipe. Cable shall be tied to the PP rope provided inside the HDPE pipe and pulled from the other end. Wherever PP rope is not available the contractor shall provide the same by air blowing method.

Cable route marker shall be provided as detailed in ***Clause 3.2.20*** of this specification.

The cables shall be tested as detailed in ***Clause 3.4.***

5 Retrieval of LT /HT / Control/Telephone cables

Retrieval of cables buried in ground

The scope of work involves retrieval of HT / LT/Control/Telephone cables of various sizes already installed underground, removal of bricks/slabs, returning the retrieved materials in good condition to the department with proper record including excavation & refilling.

Statutory permission has to be obtained in the Department to switch off the power supply at both ends of the cable and then the termination shall be removed at both ends of the cable with caution before taking up the retrieval work.

Please refer Table 1 for depth of laying of cables.

While retrieval, the cable should not get strained or damaged.

Contractor shall measure the IR Value before re-winding on the drums and marking of length in meters on the cable drum. Cable ends shall be properly covered with End caps. End Caps will be supplied by the department.

The unit rate quoted for removal of the cable shall include the cost of excavation for exposing of the cable, removal of end terminations, retrieving of bricks/slabs and stacking them in a suitable location, back-filling of the earth and re-winding the retrieved cable on to the empty cable drums provided by the Department, stencilling of cable details on the drum, transportation and handing over of the cable drums and bricks / slabs to a suitable location within a radius of 5 km as directed by the Engineer-in-Charge.

Retrieval of cables from built-in trench

The scope of the work includes removal of the already laid cable in built-in trenches, on walls, poles and from embedded pipes including removal of GI spacer, clamps etc

Statutory permission has to be obtained in the Department to switch off the power supply at both ends of the cable and then the termination shall be removed at both ends of the cable with caution before taking up the retrieval work.

After removing the GI spacer, clamps, the cable shall be retrieved with care and returned to the department.

While retrieval, the cable should not get strained or damaged.

The ends of the Hume pipe / sleeves shall be sealed properly after removing the cable.

Contractor shall measure the IR Value before re-winding the cable on the drums and marking of length in meters on the cable drum. Cable ends shall be properly covered with End caps.

The unit rate quoted for removal of the cable shall include the cost of removal of end terminations, retrieving of GI spacer, clamps and re-winding the retrieved cable on to the empty cable drums provided by the Department, stencilling of cable details on the drum, transportation and handing over of the cable drums, GI clamps / spacers to a suitable location within a radius of 5 km as directed by the Engineer-in-Charge.

6 Relaying of LT /HT / Control/Telephone cables

Relaying of cables direct in ground

The scope of the work includes, transportation of retrieved cables and bricks / slabs, relaying of the retrieved cables direct in ground, testing and commissioning of the cables, etc.

Cables shall be laid as detailed in ***Clause 3.2*** of this specification however **retrieved bricks / slabs will be issued by the Department as free issue item to cover the re-laid cables.**

Relaying of cables in built-in trench

The scope of the work includes, transportation of retrieved cables and GI clamps / spacers, relaying of the retrieved cable in built-in trenches, testing and commissioning of the cables, etc.

Cable relaying shall be carried out as per ***Clause 3.3*** of this section however, **retrieved GI spacer & clamps will be issued by the Department as free issue item to install the re- laid cables.**

7 Retrieval and relaying of cables

Retrieval and relaying – direct in ground

The scope of work involves retrieval of cables already installed underground and relaying the same / cable issued by Department in a different route.

Cables shall be retrieved from underground as detailed in ***Clause 5.1.***

The retrieved cables shall be re-laid at a different route as directed by the Engineer In-charge. Transportation of cables is also included in this item.

Relaying of cables shall be done as detailed in ***Clause 3.2*** of this specification however, for relaying of the UG cables, **retrieved bricks / slabs in good condition can be reused as directed by the Engineer In-charge to cover the re-laid cables. Shortage bricks / slabs shall be supplied by the contractor.**

Retrieval and relaying – in built-in trench

The scope of work involves retrieval of cables already installed underground and relaying the same in a different route.

Cables shall be retrieved from built-in trench as detailed in ***Clause 5.2.***

The retrieved cables shall be re-laid at a different route as directed by the Engineer In-charge. Transportation of cables is also included in this item.

Relaying of cables shall be done as detailed in ***Clause 3.3*** of this specification. However, for relaying of the UG cables, **GI spacer & clamps retrieved in good condition shall be reused as directed by the Engineer In-charge. Shortage GI spacer & clamps shall be supplied by the contractor.**

8 RCC hume pipe / DWC HDPE pipe laying

S, I of RCC hume pipe direct in ground

The scope of work involves supply of NP2 Class - RCC Hume Pipes, transportation, earthwork excavation, providing sand bedding, installation, back-filling, consolidation etc.

Hume Pipes shall be supplied with required number of collars. The Joints shall be properly made using 1:1 Cement Mortar.

The excavation and back filling of trenches shall be made as per ***clause* 2** of this section.

The pipes shall be installed at a depth of 1200mm below the ground level.

Normally the pipes shall be laid in multiples of full lengths. If necessary, however, the pipes shall be neatly cut and used. The pipes shall be laid to the extent beyond the width of road/culvert/foot path 500 mm on either side.

The pipe ends shall be sealed with double gunny bags to avoid entry of slush and soil.

S, I of RCC hume pipe across the road

The scope of work involves supply of NP2 Class - RCC Hume Pipes, transportation, cutting of existing road, earthwork excavation, providing sand bedding, installation, back-filling, consolidation etc.

Hume Pipes shall be supplied with required number of collars. The Joints shall be properly made using 1:1 Cement Mortar.

The existing road shall be cut with sufficient width for easy working and installation of the pipes. In case of busy roads, permission will be granted to cut half of the width of the road and permission will be granted to cut remaining half of the road will be granted only after restoration of the first half of the road cut earlier.

The pipes shall be installed as detailed in ***Clause 8.1.3 to 8.1.6***

After installation of the pipes, top of the road shall be made normal by providing plain cement concrete - PCC at the ratio 1:2:4 (Cement: Sand: Blue-metal) for a thickness of 150mm. The PCC required for this will be measured separately.

S, I of Double Wall Corrugated (DWC) HDPE pipes

The scope of work includes supply of double wall corrugated HDPE pipes with inner and outer diameter as per SOQ, transportation, cutting of existing road, earthwork excavation, providing sand bedding, installation, back-filling, consolidation etc.

The pipes shall be supplied with required number of couplers. The joints shall be made properly using the couplers as directed by the EIC to form a continuous and smooth passage for the cable.

Measurement will be done on number basis. Running length of 6 metres will be considered as 1 Number. In case bits are used for different lines the total length of bits will be divided by 6 and the resulting number will be considered for measurement. If the result of division is fraction then approximation to nearest whole digit will be done. This is applicable only to the entire quantity executed under the same contract.

Please refer to ***Clause 8.1.3 to 8.1.6*** for installation of pipes on plain ground / ***Clause 8.2.3 to 8.2.5*** for installation across the road.

9 Supply, fabrication and installation of cable entry arrangement

Supply fabrication and Installation of Cable entry arrangement with stainless steel pipes welded through MS plate with plastic end cap as approved by Engineer-in-charge for cable entry at cable trench.

The cable entry arrangement shall be made as per attached drawing using SS304L stainless steel medium duty pipe sleeves and high quality MS sheet steel. Relevant drawings are listed in Table 2:

Table 2

Size of cable entry plate	Drawing No.
1200 x 1200 mm	IGC/ESD/4011/2001/1
1000 x 1000 mm	IGC/ESD/4011/2001/2
750 x 750 mm	IGC/ESD/4011/2001/3
600 x 600 mm	IGC/ESD/4011/2001/4

Out of the above drawings listed in Table 2, Drawing No. as mentioned in the schedule will be applicable for this item.

MS sheet steel and SS pipes used shall be free from rust, crack and other deficiencies.

The pipes shall be arranged in such a way that it projects on both sides of the MS sheet as per corresponding drawing in Table 2.

The periphery of the pipe shall be continuously welded with the MS sheet on both sides of the plate.

The MS sheet steel shall be provided with one coat of epoxy primer and 1 coat of epoxy paint after completion of fabrication.

The cable entry arrangement shall be fixed at the mouth of electrical cable trench entry as directed by the EIC. The mouth of the pipe shall be sealed with plastic end cap by applying shellac as approved by Engineer-in-charge.

Required number of 50x6mm copper flats shall be provided in cable entry arrangement by the contractor as directed by the EIC before pouring concrete. Copper used for this purpose will be measured separately.

After placing the cable entry plate in proper position, shuttering has to be done on one side of the cable entry plate butting with the protruding pipes and the gap between cable entry plate and shutter shall be filled with 1:2:4 PCC concrete. Concreting work required for this purpose will be measured separately.

10 End termination of cables

End termination of armoured LT /control cables:

The scope of work include End Termination of the following sizes Copper/Aluminium Conductor HRPVC/ XLPE insulated and sheathed armoured UG Cable using Single Compression, Heavy Duty, Siemens type Gland connecting the cable to the equipment such as Switches/Panel Boards etc. using Copper/Aluminium crimping lugs as directed by Engineer-in-Charge. The Contractor shall arrange for making holes wherever necessary for fixing cable gland.

Gland holes shall be made in the gland plates using only Hole saw cutters of correct size or other approved methods. Use of chisel or tools of similar nature are not permitted.

The low voltage power/ control cables shall be terminated using "Siemens" type SIBG, Single compression tinned brass or SS heavy duty cable glands and suitable crimping type lugs. Aluminium lugs for Aluminium cables and Copper lugs for Copper cables shall be used.

The scope of work includes dressing of the cable at the termination end, providing supports wherever necessary and terminating the cable. Supports shall be made at the termination end such that gland plate shall not take the load. Major supports if any provided outside the switchboard, will be measured separately.

All materials required for completion of the work including gland, lugs, GI bolts, flat washers, spring washers, nuts, earthing clips, brass screws, anti-oxidation paste shall be in the scope of the contract. Wherever the SOQ (section VIII) refers, glands & lugs as free issue item, suitable glands and lugs only will be issued by department as free issue item and all other items required for completion of work shall be supplied by thecontractor.

Before crimping of lug over the conductor, a thin layer of anti-oxidation paste shall be applied over the conductor and inner surface of the lug.

IR value and phase matching of the cables shall be checked before and after termination in the presence of department supervisors.

Each terminal bolts shall be provided with 2 numbers of flat washer and 1 number spring washer. In case of termination of copper & aluminium, bus / cables, bimetallic washers shall be provided to avoid galvanic corrosion. The terminal connections shall be checked for tightness by using torque wrench in the presence of department supervisors.

Gland earthing shall be provided using copper earthing clips, brass nut & screws and suitable copper wire up to nearest earth point as listed in Table 3. The contractor shall arrange for supplyand installation of copper wire which will be measured separately.

Table 3

Size of cable	Cross section of earthing clamp
Up to 70 Sq.mm	10 x 1 mm thick copper
Above 70 Sq.mm and up to 240 Sq.mm	12 x 1 mm thick copper
Above 240 Sq.mm	25 x 3 mm thick copper

Telephone Cable End Termination

The scope of work includes cleaning the wires from filing compound, providing gland holes on the gland plate, dressing the cable at the termination end, providing supports wherever necessary and terminating the cable.

The filling compound in the telephone cables shall be thoroughly cleaned using a suitable solvent such as petrol or any other solvent as approved by the Engineer-in-Charge.

Gland holes shall be made in the gland plates using only Hole saw cutters of correct size or other approved methods. Use of chisel or tools of similar nature are not permitted.

The scope of work includes dressing of the cable at the termination end, providing supports wherever necessary and terminating the cable. Supports shall be made at the termination end such that gland plate shall not take the load. Major supports if any provided outside the switchboard, will be measured separately.

The jelly filled telephone cables shall be terminated using Single compression tinned brass (Heavy Duty) Cable Glands and connected to the KRONE Connectors as directed by the Engineer-in-Charge. Krone connectors will be measured separately.

Supply of suitable size glands and all consumable required for completion of the work shall be in the scope of the Contract.

Providing Assistance for HT Cable end termination

The scope of work includes providing assistance for end termination by making gland holes, positioning the cable in place, dressing of the cable at the termination end, transportation of material to site, disposal of all discarded materials, testing of cable etc as directed by the Engineer-in-charge.

The End termination will be carried out only by cable jointers authorized by the manufacturer and as directed by the Engineer–in–Charge. End termination of the cable is not covered under this item.

Gland holes shall be provided in the gland plates by using hole saw cutters of correct size only or other approved method. Usage of chisel will not be allowed. For HT cable terminations, in addition to providing gland hole, the gland plate shall be cut in to two removable pieces.

Transportation of gas cylinder, tools & materials, disposal of all discarded materials etc including any sundry work related to the end termination is in the scope of this item.

The scope of work includes dressing of the cable at the termination end, providing supports wherever necessary and terminating the cable. Supports shall be made at the termination end such that gland plate shall not take the load. Major supports if any provided outside the switchboard, will be measured separately.

After the completion of end termination, the gap between gland hole & HT cable, mating edge of cut gland plates shall be filled with Monoplast compound as directed by the Engineer in-charge. The scope includes supply of monoplast compound.

Before and after the completion of end termination, the cable shall be tested as detailed in ***Clause 3.4*** as directed by the Engineer-in-Charge.

After completion of end termination contractor shall make the area clean, remove all the unwanted materials and return tools equipment to department stores.

Providing assistance for LT & HT cable jointing work:

Jointing of the cables is not covered under the scope of this item.

Excavation & refilling of earth for the jointing work (for UG cable. For cables in built-in-trench exposing the cable, removal & safe storage of chequered plate/slab, spacers & clamps and restoring them to the original after jointing), removal & safe storage of bricks/ slabs, handling

the cable as required, dressing the cable after jointing, including supply of shortage material, disposal of all discarded materials etc including any sundry work related to the jointing is in the scope.

Before and after the completion of jointing, the cable shall be tested as detailed in ***Clause 3.4*** as directed by the Engineer-in-Charge.

The area near the joint shall be refilled and the ground shall be levelled. Also the area surrounding the joint shall be cleaned and all the unwanted materials shall be removed.

Cable joint indicator with same specification as RCC cable route marker of size 750 x 320 x 60mm (Refer Drawing No. IGC/ESD/5074/ 5001/1) shall be provided over the cable joint as directed by the Engineer in charge.

Tarpaulin tent shall be provided for outdoor cable jointing works depending on the site condition as decided by the EIC.

S, I, T of HT end termination kit

End termination kit of approved make suitable for cable voltage rating, size, type, indoor / outdoor etc. shall be supplied as specified in SOQ (section VIII).

End termination of cables shall be done by authorized jointers only as directed by the EIC.

Please refer ***Clause 10.3.3 to 10.3.8*** for other works involved in this item.

S, I, T of HT / LT / Control / telephone joint kit

Joint kit of approved make suitable for cable voltage rating, size, conductor type and no. of cores shall be supplied as specified in SOQ (section VIII).

Jointing of cables shall be done by authorized jointers only as directed by the EIC.

Please refer ***Clause 10.4.2 to 10.4.5*** for other works involved in this item.

11 MS and GI fabrication

MS fabrication with enamel / PU painting

Supply and Installation of MS Brackets, Supports, Frame work, Clamps, Base Channels, etc. fabricated out of angle / Channel / Rods etc. The rate quoted shall include the cost of fabrication / welding, cleaning and painting with one coat of metallic primer and two coats of synthetic enamel paint and supply & installation of required, fasteners, nuts, washers, etc.

All the materials shall be of good quality. Rerolled MS items should not be used.

The weight of the fabricated items will be calculated either based on the standard weights of the sections or weighing the fabricated item. Weights of bolts, nuts and other fasteners to be provided by the Contractor will not be considered while weighing for payment under this item.

The MS fabrication will be required for making cable supports, tray supports, base foundation frame works for Motor control centre, frame work embedment for fixing boxes in the wall etc.,

The supports should be provided with necessary holes for bolting of cable trays, installation of pressed steel saddles, tapped hole for installation of earth strip, etc.

The cantilever supports should be straight and at 90 degree to side supports. Gas cutting of angles and flats are not recommended and in case this is employed, the sharp edges should be ground to make the edges smooth.

Electric arc welding only should be used for fabricating the supports. Welding of any component/part to the other shall be only by full welding and Tack Welding will not be accepted.

Wherever the supports are installed along concreted surface, necessary holes should be drilled for installation of M-10 anchor fasteners. The drilled holes should be of appropriate size such that the anchor fasteners are flush with concrete surface. At brick work 10 mm MS bolts size 75 mm long should be used. The head of the bolt should be split for a length of 25 mm. The bolts should be grouted such that only sufficient projection is available outside plastered surface. The grouting should be properly finished and white washed. The sizes of bolts/anchor fasteners specified here is only indicative and actual size required shall be finalised and got approved by the engineer-in-charge.

In case of Enamel painting if specified in SOQ (Section VIII), all fabricated MS frame works shall be neatly cleaned, painted with one coat of anti-corrosive red oxide paint and two coats of enamel paint of approved shade. Sufficient time shall be given for drying before installation.

The components shall be transported to the work site and assembled at actual locations and installed either using steel fasteners or by grouting or by welding as directed by the Engineer- in-Charge. Installation includes welding to the existing EPs, chipping, chasing and grouting on brick surface and fixing anchor fasteners on RCC including floor for frame embedment, depending on the site condition is covered in this scope of the item.

In case of PU painting if specified in SOQ (Section VIII), all fabricated MS frame works shall be neatly cleaned, painted with one coat of Epoxy zinc phosphate primer and after 16 hours of drying one final coat of polyurethane paint with shade approved by the Engineer-In- Charge. Please refer ***Clause 11.3.3*** for installation of PU painted MS fabrication.

GI Fabrication

MS fabrication shall be made as per ***Clause 11.1.1 to 11.1.7.***

Fabricated MS item shall be shall be hot dip galvanised after the completion of all fabrication work. MS item shall be cleaned of rust, loose scale, dirt, oil, grease and other foreign substances and ground to remove any sharp edges before hot dip galvanizing. Thickness of the galvanizing shall not be less than 80 microns. The uniformity of coating test shall be carried out according to standards. The galvanised item shall not be hammered or otherwise straightened in a manner that will injure the protective coating. Galvanization shall be as per IS 4759 & latest amendments. No drilling or cutting will be permitted on the galvanised items. In exceptional cases the damage to the GI coating shall be cleared by cold galvanising compound of make approved by the Engineer in charge.

In cases where size of the item could not be measured exactly beforehand or precise work necessitating fabrication at site, MS members shall be brought to site and fabrication done to suit the site dimensional requirements. Subsequently the MS pieces shall be taken for galvanising and brought back to assemble back at site.

In case of large number of components to be fabricated the individual component shall be

uniquely numbered by punching. This shall be done during fabrication/assembling and before galvanization.
Installation of GI fabricated components shall be done as per ***Clause 11.1.9.***

GI Fabrication with Poly Urethane paint

MS fabrication shall be made and hot dip galvanized as per ***Clause 11.2.1 to 11.2.4.***
After galvanisation of frames/supports it shall be painted with one coat of Metal Coat ETCH primer followed by Epoxy zinc phosphate primer and final coat of polyurethane paint with shade approved by the Engineer- In- Charge and the sequence of application will be as below.

Substrate (Galvanised Iron)
$
Metal Coat ETCH Primer Yellow
$
(After 30 Minutes before 60 minutes)
Ind Epoxy Zinc Phosphate Primer Grey
$
(After 16 Hours)
Metal coat Polyurethane Top Coat

Procedure for Installation of PU coated GI fabrications on RCC/Brick walls etc.

Under this item fabricated frame or support shall be installed on Brick walls/ RCC Structures etc. On brick walls the frame shall be grouted as directed by the engineer-in-charge. On RCC walls where EPs are available frame shall be welded. Cold galvanising compound shall be applied in the welded area after thorough cleaning. On RCC surfaces where EPs are not available fabricated frame shall be installed using anchor fasteners. After the completion of installation, one coat of plasticiser (Clear) shall be applied on all GI surfaces of the fabricated item. All the materials required for this item is in scope of the Contractor.

12 Earthing

Specification for plate earth electrodes

The plate electrode shall be fabricated and supplied as below:
The Plate Electrode shall be of size 600 x 600 x 3 mm made out of Copper of purity not less than 95% and shall be tinned by approved means. Copper Plate shall be Supported by 50 NB heavy duty GI pipe. 2 Nos. of 25 x 3 mm Copper flat (purity > 95%) shall be connected to the copper plate by copper rivets & continuous brazing, brought out and connected to 400 mm long, 50x6 mm copper flat by copper rivets & continuous brazing which is fastened to the GI pipe at top. Bolts, Nuts and Washers used in the Electrode assembly shall be of Brass/SS as specified in Drawing Bolts shall be of 12 mm Dia. and Washers shall be of minimum 2 mm thickness. 2 Nos. Plate Washers and 1 No. Spring Washer of thickness not less than 2 mm are to be supplied for each set of bolt and nut. The Electrode shall be supplied with a detachable galvanised Cast Iron Funnel with Stainless Steel Wire Mesh, which can be screwed to the top of the Electrode. The funnel shall be provided with a grub screw to prevent pilferage. 400 mm long, 50 x 6 mm, Copper Flat shall be provided with suitable holes for fixing and Connection of grounding conductors. A sample Plate Electrode shall be submitted and got approved before taking up fabrication and effecting bulk supply. The construction/assembly and dimensions of the Plate Electrode shall generally be as detailed in IS: 3043 and as per Drawing No. IGC/ ESD/ 5060/ 1001/ 1.

Installation & testing of earth electrode

Scope of work includes transportation, installation and testing of Copper Plate Earth Electrode including supply of RCC Chambers with RCC Cover Slab, Charcoal and Sodium Bentonite of

50 Kg each, excavation of earth pit, installation of earth electrode, soil treatment with Bentonite and Charcoal, refilling, measurement of earth resistance value etc.

The earth pit shall be located at a distance of at least 3 metre away from the building or structures.

Excavation of earth is included in the scope of this item and will not be measured separately. While carrying out excavation for the earth pit, if soft/hard rock is encountered, the earth pit location shall be changed to suitable location as directed by the Engineer-in-charge. No separate payment will be made for this.

Proper tools and necessary accessories required for work such as ladder, coir ropes buckets and shuttering arrangements should be used in execution of work. All accessories required for safe working shall be employed at no extra cost.

The earth pit chamber includes providing pre-cast RCC Chamber or RCC Hume pipe (of 610 mm Dia and 450 mm Height) around the Electrode. 1:4:8 PCC of size 1000 mm square and

150 mm thickness with 450 mm Dia. hole in the centre shall be provided with suitable shuttering over and above which 1:2:4 pre-cast RCC Base of 800 mm square and 100 mm thickness shall be provided as per the Drawing No. IGC/ESD/5060/1001/1.

The RCC cover slab shall be 50 mm thick as per Drawing No. IGC/ESD/5060/1001/1and as directed by the Engineer-in-charge. The RCC cover Slab shall be engraved with marking “Earth Pit” of font size at least 3”. The RCC Cover Engraving shall be given 2 coats of Enamel paint of Yellow colour upon which engraving should be in Black colour. Also, required labelling as directed by the EIC including earth pit number shall be painted at the top cover and inside the chamber.

After completion of installation of earth electrodes, individual and combined earth resistance values of the earth pits shall be measured by earth resistance tester and furnished in the format as directed by the Engineer-in-charge. The contractor shall arrange for pouring of water for earth electrode.

After completion of the measurements the cover shall be fixed on to the chamber with plastering as directed by the Engineer in charge.

The unit rate quoted shall include the cost of excavation, back filling of soil by layers and consolidation of soil by watering, pouring of water for electrodes etc.

Installation shall be done in general according to IS: 3043 and as per Drawing No. IGC/ESD/5060/1001/1enclosed.

S, I, T of copper rod earth electrode

The scope this item includes Supply, installation and testing of 12 mm dia. Copper Solid Rod earth electrode.

The electrode shall be fabricated out of 12 mm dia, 3000 mm long copper rod of minimum purity of 95 %. Terminal strip of 250 x 37 x 6 mm of copper flat shall be brazed to the electrode at top portion and two pieces of 200 x 25 x 3 mm of copper flat shall be brazed at bottom portion as shown in Drawing No. IGC/ESD/5060/1003/1.

The terminal strip shall be provided with 6 Nos. holes for the connection of grounding

conductor and shall be supplied with 6 Nos. Bolt & Nut, 12 Nos. Plate washers and 6 Nos. spring washers. Bolts shall be of M10 length 35 mm and washers shall be of minimum 2 mm thickness. 2 Nos. plate and 1 No. spring washer shall be of thickness not less than 2 mm are to be supplied for each set of bolt and nut. Bolts, Nuts & Flat Washers used in the Electrode Assembly shall be of Brass and Spring Washers are Stainless Steel. Sample Copper Rod Electrode shall be submitted and get approved before taking up fabrication and effecting bulk supply.

The rod electrode shall be installed and tested as per guidelines for installation of Earth electrode **Clause 12.2** of this specification. Minimum diameter for the excavated area shall be 300 mm.

Installation shall be done in general according to IS: 3043 and as per Drawing No.IGC/ESD/5060/1003/1 enclosed.

S, I, T of GI pipe earth electrode

Scope of work includes supply of Earth Electrodes, Charcoal and Sodium Bentonite of 50 Kg each, excavation of pit to the required depth, erection of Earth Electrode, soil treatment with Bentonite & Charcoal mixture, refilling, consolidation of earth, Measuring of Earth resistance, removal of surplus earth, construction of earth pit chamber etc.

Excavation of earth is included in the scope of this item and will not be measured separately. For details on earth excavation please refer ***Clause* 2*.***

The unit rate quoted shall include the cost of excavation, back filling of soil by layers and consolidation of soil by watering. Pouring of water for Electrodes is also included in the scope.

Specification of GI pipe earth electrode

The pipe earth electrode shall be fabricated out of 50 NB, heavy duty pipe and the construction / assembly and dimension of the pipe electrode shall be as per drawing No. IGC / ESG / 5060 / 1007 / 1.

400 mm long, 50 x 6 mm, GI flats with suitable holes for fixing and connection of grounding conductors shall be welded on the top of the Pipe Electrode. The welding should be neat and free from pitting surrounding the weld.

The terminal flat shall be provided with 6 Nos. of 14mm dia holes for the connection of grounding conductor and shall be supplied with 6 Nos. of 12 mm dia., 50mm SS Bolts & Nuts, 12 Nos. of 2 mm thick plate washers and 6 Nos. spring washers.

After completion of all fabrication works, the electrode shall be hot dip galvanized to ensure long life and to prevent rusting. Minimum thickness of the galvanizing shall not be less than 80 microns.

The Electrode shall be supplied with detachable galvanized cast iron funnel with stainless steel wire mesh, which can be screwed on the top of the electrode. The funnel shall be provided with a 6mm x 12mm long alien key type grub screw to prevent pilferage.

The earth electrode shall be installed and tested as per guidelines for installation of earth electrode ***Clause 12.2*** of this specification.

While filling the earth pit with charcoal & Bentonite with earth care shall be taken to fill this mixture up to the entire height of the electrode buried under earth.

S,I of tinned, stranded conductor / single core unsheathed insulated flexible copper cable

Specification for tinned, stranded conductor / single core unsheathed insulated flexible copper cable

The specification of copper conductor supplied shall be as detailed in table 4 and area of cross section of conductor shall be as per SOQ.

Table 4

S. No	Description	Tinned Stranded Copper conductor	Single core unsheathed insulated flexible copper conductor
1	Standards	Relevant IS/IEC/ASTM	Relevant IS/IEC/ASTM
2	Type of conductor	Class 2 (Stranded)	Class 5 (Flexible)
3	Type of Drawn	Dead soft Annealed	Annealed
4	Max. Conductor resistance in Ohm /km @ 20 deg C	As per IS 8130 – Table 2	As per IS 8130 – Table 3
5	Min. No. of Strands	As per IS 8130 – Table 2	-
6	Max. Dia of wires in mm	-	As per IS 8130 – Table 3
7	Percentage of Copper	> 95 %	> 95 %

The area of cross section of conductor and no. of strands shall be maintained constant throughout the length of the conductor as per IS.

In case of tinned stranded copper conductor, uniform and required thickness of tin coating shall be ensured.

The copper conductor shall conform to the relevant IS amended up to date and shall be supplied in non-returnable drums. Safe delivery and unloading is in the scope of the supplier.

The conductor shall be manufactured and tested as per the currently applicable standards for electric power conductor as listed below:

a) IS - 613: Copper rods and bars for Electrical purposes –Specification.

b) IS – 14214: Annealed stranded Copper conductors for jumper wires-specification.

c) IS -1778; Reels and drums for bare conductors.

d) IS – 1885: Electro technical Vocabulary: Part-32.Cables, Conductors and Accessories for electricity supply.

e) IS – 191: Copper –specification.

f) ASTM – B3 - Specification for Soft or Annealed Copper Wire

g) ASTM – 33 - Specification for Tinned Soft or Annealed Copper Wire for Electrical Purposes

Test certificate shall be submitted along with the conductor. After submitting the copper to the department, copper will be tested at department lab. If purity is not confirmed, then the contractor has to replace the conductor.

The contractor shall measure the exact route length and cut the conductor and measure the same in the presence of Engineer in charge before laying the conductor.

Installation of copper earthing conductor direct in ground

The scope of work includes excavation of soil required for installation of conductor, refilling and levelling of trenches after installation of conductor etc.

The conductor shall be laid at a depth of 800mm from top of the natural ground level without any protective covering.

Excavation of earth is included in the scope of this item and will not be measured separately. For details on earth excavation please refer ***Clause* 2*.***

After installation of conductor the trench shall be refilled, levelled and excess earth shall be disposed as per ***Clause 2.1.7.***

Installation of copper earthing conductor in built-in trenches

The conductor shall be installed in Built in trenches/ walls / hume pipes, etc. as directed by the EIC.

The conductor shall be clamped at every 600mm intervals using GI / Aluminium clamps of size 25mm x 2mm and GI spacers of size 25x6mm. In case of outdoor installation or for lightning protection system, lead roll plugs and brass screws shall be used for fixing the conductor on the wall / roof.

End termination of stranded copper conductors / unsheathed insulated flexible copper cable

The copper conductor shall be terminated with suitable size crimping type copper lugs.

If the point of connecting earth conductor is not readily available, the contractor shall make arrangements for connection of earth conductor, such as drilling, tinning, etc.

All the materials required for termination such as copper lugs, brass bolts, nuts, washers, tinning paste, consumables, etc are included in the scope of this item.

Supply and installation of copper flats

Specification of copper flats

The copper flats shall be bare copper of purity not less than 95%.

The dimensions of copper flat shall be as per the SOQ.

The conductor will be measured in metre basis. The contractor shall measure the exact route length and cut the conductor in the presence of Engineer in charge before laying the conductor.

Installation of copper flats direct in ground

Installation of copper flats shall be done as detailed in ***Clause 12.5.2***

Any joint between two lengths shall be carried out by means of exothermic welding. Exothermic joint will be measured separately. In case required item is not in the contract, the joint shall be done using riveting with 4 Nos. of copper rivets or brazing.

End termination of copper conductor is part of this item which includes drilling holes, tinning, providing SS/Brass nut & bolts etc as directed by the Engineer-in-Charge. Wherever bolted joints are adopted, the jointing surface shall be tinned as directed by the Engineer-in-Charge.

Installation of copper flats in built-in trenches

Installation of copper flats shall be done as detailed in ***Clause 12.5.3***

Any joint between two lengths shall be carried out by means of exothermic welding. Exothermic joint will be measured separately. In case required item is not in the contract, the joint shall be done using riveting with 4 Nos. of copper rivets or brazing.

End termination of copper conductor is part of this item which includes drilling holes, tinning, providing SS/Brass nut & bolts etc as directed by the Engineer-in-Charge. Wherever bolted joints are adopted, the jointing surface shall be tinned as directed by the Engineer-in-Charge.

Supply and laying of single strand copper wire

Specification of single strand copper wire

The copper wire shall be of purity not less than 95% copper. The nominal cross section of the copper wire shall be uniform to entire length. The copper wire supplied shall be as detailed in Table 5.

The conductor will be measured in metre basis. The contractor shall measure the exact route length and cut the conductor in the presence of Engineer in charge before laying the conductor.

Table 5

S. No.	Description	8 SWG	14 SWG
1	Standards	Relevant IS/IEC/ASTM	Relevant IS/IEC/ASTM
2	Type of conductor	Class 1 (Stranded)	Class 1 (Stranded)
3	Type of Drawn	Dead soft Annealed	Dead soft Annealed
4	Nominal Diameter	4.064 mm	2.032 mm
5	Nominal Cross - section area of total conductor	12.97 sq.mm	3.24 sq.mm
6	Max. Conductor resistance @ 20 deg C	1.4 Ohm/km	5.9 Ohm/km
7	Percentage of Copper	> 95 %	> 95 %

Installation of single strand copper wire direct in ground

Installation of single strand copper wire shall be done as detailed in ***Clause 12.5.2***

End termination of copper conductor is part of this item which includes drilling holes, tinning, supply of tinned copper crimping lugs, SS/Brass nut & bolts etc. Tinned copper crimping type terminals shall be used for end terminations of conductors/wires. Wherever bolted joints are adopted, the jointing surface shall be tinned as directed by the Engineer-in-Charge.

Installation of single strand copper wire in built-in trenches

The conductor shall be installed in Built in trenches/ walls / Hume pipes, etc.

The conductor shall be clamped at every 600mm intervals with suitable size copper clip or equivalent as directed by the EIC.

End termination of copper conductor is part of this item which includes

drilling holes, tinning, supply of tinned copper crimping lugs, SS/Brass nut & bolts etc. Tinned copper crimping type terminals shall be used for end terminations of conductors/wires. Wherever bolted joints are adopted, the jointing surface shall be tinned as directed by the Engineer-in-Charge.

S, I of GI flats

Specification of GI flats

MS Flat used for fabrication of GI flats shall be conforming to IS 2062 and free from rust, dirt etc.

Please refer ***Clause 11.2.1 to 11.2.4*** for fabrication and hot dip galvanization.

Installation of GI flats direct in ground

Installation of GI flats shall be done as detailed in ***Clause 12.5.2***

To join two pieces of GI flat 4 Nos. of copper rivets / 2 Nos. of bolts with plain washers shall be provided for each joint such that there is no gap exists between the flats. After each joint the surface shall be cleaned with banyan waste and a protective layer of cold galvanizing spray shall be applied such that any hammered or exposed area without the protective coating gets galvanised.

End termination of GI conductor is part of this item which includes drilling holes, cold galvanization, providing SS/Brass nut & bolts etc as directed by the Engineer-in-Charge.

Installation of GI flats in built-in trenches

Installation of GI flats shall be done as detailed in ***Clause 12.5.3***

Please refer ***Clause 12.9.2.2 to 12.9.2.3*** for making joints and end termination.

S, I of earth junction points

25 x 3 mm Copper flat of length 300 mm shall be fabricated with sufficient number of holes as directed by engineer in charge.

Tinning of copper flat shall be done after completion of all fabrication works. Supply of tinning paste, tools required for tinning etc. are in the scope of this item.

The copper flat shall be installed on wall / trench.

S, I of clean earth junction points

25 x 3 mm Copper flat of length 200 mm shall be fabricated with sufficient number of holes as directed by engineer in charge.

Tinning of copper flat shall be done after completion of all fabrication works. Supply of tinning paste, tools required for tinning etc. are included in the scope of this item.

The copper flat shall be fixed over 2 Nos. of 25 x 25 (1/4", M-6) DMC insulators mounted on wall / trench depending on the site condition.

S, I, T of copper bonded steel rod earth electrode with ground enhancing material

The scope of work under this item includes supply & installation of maintenance free earth electrode, providing RCC earth pit chamber with RCC cover, excavation & refilling, measurement of earth resistance, labelling etc.

The maintenance free earth electrode shall consist of corrosive resistant, copper bonded steel rod of size 3m long, 5/8 inch diameter. It shall be molecular bonded with copper to high strength steel cores with a minimum copper bonding of 250microns.

The electrode shall be installed as per the following steps:

250mm or larger diameter bore to a depth 150mm less than the length of ground rod shall be drilled in the ground.

The bore shall be filled with red garden-sand and ramped properly for compaction.

3 days after compaction, bore shall be drilled at the centre of the filled up 250mm bore. The diameter of new bore shall be 75mm /150mm respectively for single rod type / three rod type electrode.

The electrode shall be placed into the centre of bore and driven up to 300mm below the bottom of the bore.

The space around the electrode in the bore shall be filled with non-corrosive, non-soluble, highly hygroscopic electrical conductive Ground Enhancement Material (GEM) around the electrode and tamped with wooden pole to ensure proper and complete filling of bore by GEM. Quantity of GEM required is 22 kg for single rod type electrodes and 33 kg for three rod type electrodes.

Earthing clamps shall be fixed on the top of the electrode to facilitate connections to the electrode as directed by the EIC.

Please refer ***clause 12.2.2 to 12.2.9*** for other works involved in the scope of this item.

13 Poles

Specification for PU coated GI street light / Flood light poles

Please refer the respective drawing as per the list given below for a particular type of pole specified in SOQ.

a) Single arm street light pole 9m - Drawing No. IGC/ESD/4013/5005/1
b) Double arm street light pole 9m - Drawing No. IGC/ESD/4013/5005/3
c) Street light pole 11m - Drawing No. IGC/ESD/4013/5003/1
d) Flood light pole 11m - Drawing No. IGC/ESD/4013/5004/1

The pole drawings are typical and actual pole drawing shall be submitted by the Contractor for approval of the EIC.

Fabricated heavy duty pipes / Post (pole) shall be hot dip galvanised and PU coated as detailed in ***Clause 11.3***

At most care shall be taken to avoid any damage to the protective coating. The pole shall be wrapped in hard board sheets to avoid any damage to the protective coating. The wrapping shall be kept intact till the time of commissioning.

Crane and Trailer required for transportation and erection purpose

shall be arranged by the Contractor at their own cost. Metallic wire ropes shall not be used to unload the poles.

Draw wire shall be provided inside the pole for laying of flexible cable from street light JB to the light fixtures.

Installation of street / flood light GI poles

The scope of work includes transportation, unloading at site and installation poles along with foundation bolts, GI conduits, street light JB with termination arrangement, providing foundation, etc. as per the drawings.The following components shall be supplied and installed before concrete pouring.

i. MS support as per the drawing shall be fabricated and placed inside the concrete to sup- port the foundation bolt and cable entry conduits. MS support shall be placed over a 300 x 300 x 6mm MS plate resting on the mud mat (base) concrete of 1: 4: 8 PCC as directed by the Engineer-in-charge. The MS supports will not be measured separately.

ii. 4 Nos. of foundation bolts shall be welded with the MS support as shown in the drawing.

iii. 2 Nos. (Approx 25% of the total number of pole foundations to be provided with 3 Nos. de- pending on site conditions as directed by the EIC) of 40mm NB, 1500mm long, heavy duty, GI pipe for cable entry.

iv. 2 Runs of 8 SWG hot dip galvanised conductor shall be laid from junction box of the pole to the earth point provided in the pole and from there to the earth. The tail of the conductor (approx.1m) shall be wound helically and buried in earth at 1 m depth. Total length of GI wire shall be 2 x 6 metre.

v. 3 Core x 1.5 Sq. mm (in case of flood light poles 3 Core x 2.5 Sq.mm) PVC insulated and PVC sheathed, 1100 Volts Grade, flexible copper conductor cable. It shall be laid inside the pole from the junction box to the street light fitting and terminated at both the ends with suitable copper crimping lugs. The flexible cable shall be continuous and there should not be any intermediate joint. The flexible cable drawn through the pole shall have sufficient slackness along the route and sufficient extra length shall be provided at the junction box. Suitable PVC conduit bushes shall be provided at the junction box to avoid any damage to the insulation while pulling the cable. The third core, green wire shall be used as earth wire and connection to the earth terminals at both end.

Concreting shall be taken up after placing the MS support with MS bottom plate, GI conduits for cable entry, foundation bolts, and 8SWG earth conductors, etc. in their respective positions as indicated in the drawing.

32mm GI conduit of minimum 2m length shall be welded vertically at the centre point of MS template of appropriate size. This dummy pole arrangement shall be fabricated and mounted on the foundation bolts by the contractor for ensuring alignment of the poles.

The contractor shall ensure that GI pole being installed is in proper alignment and level to other poles. Concreting shall be done after getting the concurrence from EIC.

Foundation concrete shall be provided using 1: 3: 6 PCC and mud mat (base) concrete of 1: 4: 8 PCC of dimensions indicated in the drawing. Depending on the site conditions EIC may modify the foundation concrete dimensions keeping the volume of concrete same. Curing of concrete shall be carried out for minimum period of seven days. The Street Light Poles shall be erected over the foundation after ten days of casting the foundation.

The pedestal above ground level shall be plastered to neat finish and painted with cement paint.

Sufficient care shall be taken in handling and transporting of poles. Slinging arrangement shall be as approved by the Engineer-in-Charge. Poles shall preferably be loaded and unloaded by means of crane or other similar mechanical devices.

The poles shall be installed on the foundation bolts as directed by the EIC.

In cases of mismatch in dia between the pipe end indented to fix the street light luminaires and luminaires, the contractor shall modify pipe end by supply and installation of 200mm long suitable size heavy duty GI pipe on the existing pipe end and tighten it using M10 x 65 mm SS Bolt with necessary nut & washers. Supply & Installation of luminaires will be measured separately.

Street light junction box as per the drawing No. IGC/ESD/2021/6001/1 shall be supplied and installed. Please refer ***Clause 13.6*** for detailed specification of street light junction box.

Suitable holes shall be drilled on the street light junction box and coupled with the hole already provided on the GI pole for the indented purpose.

Unused holes and GI Pipe mouth shall be covered with PVC dummy to achieve dust and vermin proof.

All the street light poles shall be identified with numbering as directed by the Engineer-in- Charge, giving the Circuit, Phase and Pole number. The identification number shall be marked in paint.

Earth work excavation, shuttering, concreting and all other pre requisite works are under scope of this item. All material required for the completion of the work is in the scope of this item.

Specification for PU coated / Hammer tone finish GI Post Top Lantern (PTL)

Please refer the respective drawing as per the list given below for a particular type of PTL specified in SOQ.

a) PTL embedded foundation type 2.75m - Drawing No. IGC/ESD/4013/1001/P1
b) PTL pedestal type 3.75m & 4.75m - Drawing No. IGC/ESD/2021/6001/P2
c) PTL with single arm 2.75m - Drawing No. IGC/ESD/4013/1001/P11

The PTL shall be fabricated as per the drawing and supplied.

The posts required for mounting the area lights shall be fabricated from 50mm NB heavy duty MS pipes and hot dip galvanised as per

the drawing and as directed by the Engineer-in- Charge.

In case of pedestal type PTL bottom of the pipe shall be welded with 250x250x6mm MS plate as shown in the drawing. Holes required for flexible cable entry from JB shall be provided in the pole before hot dip galvanizing.

In case of embedded foundation type PTL / PTL with single arm, the GI pole shall be welded with 250mm outer dia., 51 mm inner dia., 10 mm thick Stainless steel (SS 304L) flange. Required holes shall be provided on this flange as shown in the drawing for erection of poles. Holes provided on the flange shall be matching with the holes provided on the SS flange embedded in the foundation concrete. 3 Nos. of stiffeners made of 6mm thick MS shall be welded on the flange with the pipes as shown in the drawing.

In case of PU coating if specified in SOQ (Section VIII), the completely fabricated pole shall be PU coated as detailed in **Clause 11.3**.

In case of hammer tone coating if specified in SOQ (Section VIII), the completely fabricated pole shall be painted with one coat of anti-corrosive red oxide paint and two coats of hammer tone paint of approved shade.

A sample Post shall be fabricated and got approved by the Engineer-in-Charge, prior to taking up the fabrication in bulk.

Installation of pedestal type PTL

2 Nos., 40mm NB, heavy duty, GI conduits of length 1.1m shall be embedded in the foundation concrete for cable entry at the bottom of Junction Box. 25% of pole foundations to be provided with 3 Nos. 40mm NB, heavy duty, GI conduits of length 1.1m as directed by the EIC.

2 Runs of 8 SWG copper earthing wires each of length 3 m shall be connected to the earth terminals of Junction Box, routed through the GI conduits and buried inside the earth in the helical form.

Cast Aluminium JB shall be embedded in the foundation concrete. Please refer ***Clause 13.6.3 to 13.6.9*** for internal details of the JB.

Concreting shall be taken up after placing the GI pole, GI conduits for cable entry and cast Aluminium junction box, 8SWG copper earth conductors, etc. in their respective positions as indicated in the Drawing no. IGC/ESD/2021/6001/P2.

The contractor shall ensure that GI pole being installed is in proper alignment and level to other poles. Concreting shall be done after getting the concurrence from EIC.

Foundation concrete shall be provided using 1: 3: 6 PCC and mud mat (base) concrete of 1: 4: 8 PCC of dimensions indicated in the drawing.

The pedestal above ground level shall be plastered to neat finish and painted with cement paint.

Suitable holes shall be drilled on the cast Aluminium junction box and coupled with the hole already provided on the GI pole for the indented

purpose.

Unused holes and GI Pipe mouth in the junction boxes shall be covered with PVC dummy to achieve dust and vermin proof.

The Junction Box interior shall be sprayed with anti termite solution after carrying out necessary preventive maintenance.

The cable drawn through the pipe shall be continuous and there shall not be any intermediate joint and have sufficient slackness along the pipe. Also sufficient length cable shall be provided at the junction box. Suitable PVC conduit bushes shall be provided at the junction box end for avoiding the damages of insulation while pulling the cable. The third core green wire shall be used as earth wire and connection to the earth terminals at both end.

Earth work excavation, shuttering, concreting and all other pre requisite works are under scope of this item. All material required for the completion of the work is in the scope of this item.

Installation of embedded foundation type PTL / PTL with single arm / Bollards

Scope of work involves fabrication, supply and embedment of cylindrical junction box, providing foundation, GI conduits, 8 SWG copper earthing conductors, providing terminal block, laying of termination of flexible cable, etc. as per the drawing IGC/ESD/4013/1001/2 and as directed by the EIC.

Fabrication, supply and embedment of cylindrical junction box with SS top flange

i. Cylindrical junction box shall be made out of 3 mm thick sheet steel free from scales, rust, etc. with suitable gasket arrangement (in groove). The fabricated items shall be cleaned thoroughly to remove all rust, and ground to remove any sharp edges if any, before paint- ing. The inner and outer of the junction box shall be finished smoothly and given two coat of zinc phosphate primer and two coat of enamel paint of approved colour by the EIC. Drill- ing or modifications in junction boxes will not be permitted at site.

ii. MS gland plate of 3 mm thickness shall be provided inside the JB with 3 No. holes for ter- mination of cable glands. The size of holes shall be decided on the basis of size of cable glands to be used for the incoming power cables.

iii. Junction Boxes shall be provided with 6 Way 30 Amps, Stud Type Terminal Blocks mounted in suitable channel/Din rail with 4 Nos. links (Jumpers) made out of 2.5 Sq. mm, Single Core, 1100 Volts Grade, HRPVC insulated, stranded, flexible copper cable. Suitable recess shall be providing for mounting of terminal connector.

iv. 250mm outer dia., 160 mm inner dia., 10 mm thick stainless steel (SS) flange shall be con- tinuous welded at the top of cylindrical JB. Holes shall be provided on the SS flange with 10 mm SS bolts for erection of poles as per the drawing. These holes shall be matching with the holes in the base flange at the pole.

v. Groove to be provided on top of the SS Flange and 5mm thick 'O' ring of matching size shall be provided.

vi. The cylindrical JB shall be provided 3 mm thick MS top cover for temporary closing of the JB till completion of erection.

2 Runs of 8 SWG copper earthing wires each of length 2 m shall be connected to the earth terminals of Junction Box, routed through the GI conduits and buried inside the earth in the helical form.

3 Nos. 40mm NB, heavy duty, GI conduits of each 700 mm length shall be provided at the bottom of the JB for cable entry.

Concreting shall be taken up after placing the Cylindrical JB, GI conduits for cable entry and 8SWG copper earth conductors, etc. in their respective positions as indicated in the Drawing no. IGC/ESD/4013/1001/2.

Foundation concrete shall be provided using 1: 3: 6 PCC and mud mat (base) concrete of 1: 4: 8 PCC as per the dimensions indicated in the drawing.

The PTL shall be erected over the embedded JB by SS Allen screw.

Please refer ***Clause 13.4.9 to 13.4.12*** for other works involved in the scope of this item.

S, I of GFRP JB with hinged cover for Street light poles

Scope of work includes supply of Glass Fibre Reinforced Polyester Junction Box (GFRP JB) with hinged cover for street and area lighting system including supply of 25 x 6 mm Aluminium or 25 x 3 mm hot dip galvanised MS) clamp, 25 x 6 GI spacer with 8mm dia. x 35mm long stainless steel fixing fasteners.

The JB shall be made of *Glass Fibre Reinforced Polyester / Polyamide*, conforming to DIN 16911 type 803 or DIN 16913 type 834 - 834.5. The cover shall be provided with 2 numbers of stainless steel hinges and stainless steel fastener. A sample box shall be submitted for approval by EIC before proceeding with bulk procurement of boxes.

The JB shall be of a weather-proof IP 66 and vermin proof construction.

Enamel danger board of size 75 x 50 mm (preferable) with skull mark and 415 Volts message shall be fixed on each junction box cover, alternatively a suitable embossed caution mark shall be provided as approved by EIC.

Drilling or modification to Junction Boxes at site will not be permitted.

Internal arrangement for The JB shall be as per drawing no. IGC/ESD/2021/6001/1.

The overall dimensions of the JB shall not be less than 240(H) x 210(L) x 75(D) mm and the wall thickness shall be 6 mm nominal.

The JB shall be provided with 3 Nos. holes at the bottom suitable for 4 Core x 35 Sq. mm armoured cable.

The following components shall be supplied and installed in the JB:

i. 1 No. terminal block having 6 Way, 63 Amps, stainless steel stud terminals. The termi- nal block shall preferably be made out of resin filled with fiber glass and shall have bar- rier between terminal and end plates. The terminal block shall be mounted in suitable channel.
ii. 1 No. 16 Amps, Bakelite Fuse Unit with 2 Amps HRC Fuse.
iii. 2 Nos. 6 mm Bolt, 2 Nuts & 4 Washers (Stainless steel).
iv. 2 Nos. jumpers made out of 2.5 Sq.mm, Single Core, 1100 Volts Grade, PVC Insulat- ed, stranded, flexible copper cable.

S, I, T, C of LDR switch in GFRP JB

Scope of work includes supply, installation, testing & commissioning of LDR (Light Dependant Resistor) unit housed in a Glass Fibre Reinforced Polyester Junction Box (GFRP JB) including installation and termination of 4Cx2.5 Sq. mm armoured cable from energy saver module to LDR.

The JB shall be fabricated as per drawing no. IGC/ESD/2021/6001/2. Please refer ***Clause 13.6.2 to 13.6.5*** for details of the junction box.

The top of the JB shall be provided with a transparent glass arrangement for the LDR to sense the ambient light.

LDR unit shall be fixed in the JB. The LDR unit shall consist of a relay operating on 230 Volts AC and shall be designed picks up after sun set and drops down after sun rise in the morning thus controlling the street light controller depending on the availability of ambient light.

This unit is to be installed at elevated locations on walls or support frames according to the site condition.

Interconnecting cable between the JB & the street light controller (4Cx2.5 Sq. mm armoured cable) shall be installed and terminated by the contractor as per ***Clause 3.3 and 10.1***. Cable for this will be provided by department free of cost.

Removal and reinstallation of RCC / PTL poles

Scope of work includes removal and reinstallation of RCC pole (9 m to 14.5 m height) / PTL (up to 4 m) with light fixture, junction box etc from existing location, transportation and re- installation of the same in a new location over 1:4:8 mud mat concrete.

Earth excavation is in the scope of this item. It shall be carried out as per ***Clause* 2.**

The Pole with base concrete shall be removed from the existing location.

The pole shall be transported within 7km from the existing location to a new location identified by the EIC. Sufficient care shall be taken in handling and transporting of these poles. In case of RCC poles, care shall be taken to avoid placing sling at the neck point of the poles and the poles shall be preferably be loaded and unloaded by means of crane or other similar

mechanical devices. Crane and lorry/trailer truck required for transportation and erection purpose shall be arranged by the contractor.

In case of RCC pole, the pole shall be checked thoroughly for damages. Minor repair works using cement, sand and Araldite wherever required. If any reinforcement is found exposed and the cover concrete is damaged / chipped off for a length of 100mm and above, the damage shall be repaired using a suitable concrete with a mix of concrete bonding kit or Araldite.

The embedded conduits shall be cleared of mud and draw wire shall be provided. All the exposed surfaces of the embedded junction boxes and the conduits shall be cleaned and painted with one coat of red oxide & 2 coats of paints. Rusted / corroded fasteners shall be replaced with the new one. Earthing for Junction boxes shall be made with the retrieved 8 SWG copper wires from the removed pole. Wherever earthing wires are damaged or missing, 2 runs of 8 SWG GI wire of 4m each shall be supplied and installed.

Junction Boxes if found damaged shall be replaced with new one. Required JB will be issued free of cost by the department.

The base concrete of the pole shall be erected at a depth as decided by the EIC, over the mud mat (base) concrete of 1:4:8 PCC of size 1000 X 1000 X 150 mm. The excavation and base concreting required for satisfactory completion of the work shall be carried out by the Contractor.

The contractor shall ensure that the pole being installed is in proper alignment and level to other poles. Filling up the excavation and compacting of the soil around the pole shall be done after getting approval from the EIC.

All the poles shall be identified with numbering as directed by the Engineer-in-Charge, giving the Circuit, Phase and Pole number. The identification number shall be marked in paint.

Removal of RCC / PTL poles

Scope of work includes removal of RCC pole (9 m to 14.5 m height) or PTL (up to 4 m) with light fixture, junction box etc from existing location, transportation within a distance of 7km and storing at a place identified by the EIC. Please refer ***Clause 13.8.2 & 13.8.4*** for details.

The light fixture shall be removed and handed over to divisional stores.

Reinstallation of RCC / PTL poles

Scope of work includes loading, transportation within a distance of 7km and reinstallation of RCC pole (9 m to 14.5 m height) or PTL (up to 4 m) from storage yard and reinstallation as per ***clause 13.8.4 to 13.8.10.***

Specification of Mini Mast

Please refer to the following table for specification of Mini Mast.

SI.NO	DESCRIPTION	TECHANICAL PARTICULARS
1	MINI MAST STRUCTURE DETIALS	
1.1	HEIGHT OF MINI MAST	16 metre
1.2	MATERIALS OF CONSTRUCTION	Hot Rolled MS Plate strip as per BSEN 10025
1.3	NUMBER OF SECTIONS	2 Sections
1.4	NORMAL THICKNESS OF BOTTOM SECTION	4 mm
1.5	NORMAL THICKNESS OF TOP SECTION	4 mm
1.6	CROSS SECTION OF MAST	18ƒ20 Sides Polygon
1.7	LENGTH OF BOTTOM SECTION	8500 mm
1.8	LENGTH OF TOP SECTION	8000 mm
1.9	TOP DIA – AƒF	160 mm
1.10	BOTTOM DIA – AƒF	350 mm
1.11	CIRCULAR BASE PLATE DIMENSIONS (OD X THK)	540 x 25
1.12	PITCH CIRCLE DIAMETER	460 mm
1.13	FOUNDATION BOLTS	M25 X900mm length
1.14	NUMBER OF FOUNDATION BOLTS	12 Nos.
1.15	THICKNESS OF GALVANIZATIONS(mm)	Min 70 Microns as per IS2629
1.16	SIZE OF DOOR OPENING THE BASE SECTION	300 x 1200 mm
1.17	ANCHOR PLATE & TEMPLATE	2 Nos. each of 3mm thick
2	DYNAMIC LOADING	
2.1	MAXIMUM DESIGN WIND SPEED	180 kmƒh
3	LANTERN CARRIAGE	
3.1	DIAMETER OF CARRIAGE RING – ID	1200 mm
3.2	LOAD CARRYING CAPACITY	750 kg
3.3	PROVISION FOR FIXING OF LUMINARIES	12 Nos.
3.4	STANDARD & CONSTRUCTION	IS 1239 – Medium class
3.5	NUMBER OF SEGMENTS	2 segments
4	DOUBLE DRUM WINCH	
4.1	CAPACITY	750 Kg
4.2	METHOD OF OPERATION	Motorized ƒ Manual
4.3	GEAR RATIO	40:1
5	STAINLESS STEEL WIRE ROPE	
5.1	TYPE OF ROPE	SS
5.2	NUMBER OF ROPES	2 for winch & 3 for Lantern Carriage
5.3	DIAMETER OF ROPE	6 mm
5.4	BREAKING LOAD	2300 kg
5.5	THIMBLES AND TERMINALS	Shall be Provided
6	POWER TOOL	
6.1	INPUT SUPPLY	3 Phase , 415V, 50 Hz, 1 HP
2	REVERSIBLE	With Reversible provision which can be operated at a distance of 3Mtrs away from the mast.
6.3	SPEED	960 RPM

6.4	TYPE	Fixed Type
7	HEAD FRAME	
7.1	TYPE	3 way
7.2	DIA OF PULLEY	100 mm
7.3	NO. OF PULLEY	8 Nos.
7.4	TYPE OF PULLEY	Large enough to accommodate the SS wire ropes and the multi −core ERP insulated PCP sheeting trailing cable.
7.5	PULLEY MATERIAL	Die−cast−LM−6
7.6	GUIDES	Close fitted guides and sleeves shall be provided (close to pulley OD) to ensure that the rope and cable do not dislocated from pulley.
7.7	Junction Box	Junction box with terminal blocks suitable for termination of flexible cables from light fixtures and bottom junction box shall be provided. Fasteners for junction box shall be brass ƒ SS.
8	LIGHTINING ARRESTER	1m length galvanised pipe with top arrow will be fitted at top of the head frame cover.
9	WINCH DETAILS	
9.1	TYPE OF WINCH,NUMBER OF DRUMS	Double drum
9.2	CAPACITY	750 Kg
9.3	METHOD OF OPERATION	Manual ƒpower in Built
9.4	MATERIAL OF CONSTRUCTION OF GEAR	Casting
9.5	LUBRICATION	Gear Oil(built in Oil bath)
9.6	GEAR RATIO	40:1
10	TRAILING CABLE	
10.1	TYPE	5 Core x 4 Sq. mm Core Flexible
10.2	MATERIAL	Insulated
10.3	MAKE	Standard as per ISI Make.
11	Motor Protection Circuit Breaker	Suitable for 3 Phase, 415V, 50 Hz, 1 HP Motor

Fabricated Mini Mast shall be hot dip galvanised and PU coated as detailed in ***Clause 11.3***

At most care shall be taken to avoid any damage to the protective coating. The mini mast shall be wrapped in hard board sheets to avoid any damage to the protective coating. The wrapping shall be kept intact till the time of commissioning.

Crane and Trailer required for transportation and unloading purpose shall be arranged by the Contractor at their own cost. Metallic wire ropes shall not be used to unload the mini mast.

Draw wire shall be provided inside the mini mast for laying of flexible cable from JB to the light fixtures.

Installation, testing and commissioning of Mini Mast

The scope of work includes loading, transportation, unloading at site and installation of mini mast along with foundation bolts, GI conduits,

JB with termination arrangement, providing RCC foundation, earth electrode, earth pit chamber etc. Earth work excavation, shuttering, concreting and all other pre requisite works are under scope of this item. All the materials required for the completion of the work is included in the scope of this item except 1 No. earth electrode which only will be issued by Department free of cost. Supply & Installation of luminaires will be measured separately.

The following components shall be supplied and installed before concrete pouring.

i. Foundation bolts (Quantity as recommended by the manufacturer) shall be welded with the MS support as shown in the drawing.

ii. 3 Nos. of 40mm NB, 1500mm long, heavy duty, GI pipe for cable entry.

iii. 2 runs of 8 SWG, hot dip galvanised conductor each of length 5 metre for earthing of mini mast. One end of the conductor shall be connected to the earth terminals of JB and other end shall be connected to the earth electrode.

Foundation concrete with reinforcement shall be provided as per drawing No.: IGC/ ES/ EL/
421. Concreting shall be taken up after placing the GI conduits for cable entry, foundation bolts, and 8 SWG earth conductors, etc. in their respective positions as indicated in the drawing. Foundation concrete shall be provided using 1: 2: 4 RCC and mud mat (base) concrete of 1: 4: 8 PCC of dimensions indicated in the drawing.

2mm GI conduit of minimum 2m length shall be welded vertically at the centre point of MS template of appropriate size. This dummy pole arrangement shall be fabricated and mounted on the foundation bolts by the contractor for ensuring alignment of the poles. The contractor shall ensure that mini mast being installed is in proper alignment and level to other poles. Concreting shall be done after getting the concurrence from EIC.

5 Core x 4 Sq.mm PVC insulated and PVC sheathed, 1100 Volts Grade, flexible copper conductor cable. It shall be laid inside the mini mast from the junction box to the street light fitting and terminated at both the ends with suitable copper crimping lugs. The flexible cable shall be continuous and there should not be any intermediate joint. The flexible cable drawn through the mini mast shall have sufficient slackness along the route and sufficient extra length shall be provided at the junction box. Suitable PVC conduit bushes shall be provided at the junction box to avoid any damage to the insulation while pulling the cable. The green wire shall be used as earth wire and connection to the earth terminals at both end.

The mini mast shall be erected over the foundation after ten days of casting the foundation.

The pedestal above ground level shall be plastered to neat finish and painted with cement paint.

Sufficient care shall be taken in handling and transporting of mini mast. The mini mast shall be handled by means of crane or other similar

mechanical devices. Metallic ropes should not be used to avoid damage to the protective coating. Slinging arrangement shall be as approved by the Engineer-in-Charge.

The mini mast shall be installed on the foundation bolts as directed by the EIC.

Unused holes and GI Pipe mouth shall be covered with PVC dummy to achieve dust and vermin proof.

The mini mast shall be identified with numbering as directed by the Engineer-in-Charge, giving the Circuit, Phase and Pole number. The identification number shall be marked in paint.

1 No. earth electrode issued by Department shall be installed as per ***Clause 12.2.***

14 Switchgear and control gear units

S, I, T, C of SDF units

The scope of work involves supply, installation, testing and commissioning of TPN SDFU with sheet steel enclosure.

The current rating of SDFU shall be as per the SOQ in section VIII.

SDFUs shall be rated for continuous operation at nominal current and rated maximum Voltage of 440 Volts. They shall have an overload breaking capacity of 8 times the rated nominal current and a making capacity (0.35 pf) of 6 times the rated nominal current. They shall be suitable for motor duty (AC 23A category IS 4064).

The SDFUs shall have an easily removable neutral link of adequate size to suit the Power Cable.

Complete phase/ phase segregation shall be provided. The moulded insulation shall have high temperature and arc withstand capacity.

It should be possible to lock the switch in OFF position.

Door interlock shall be provided to ensure that the cubicle door cannot be opened when the switch is in ON position. Provision shall be available to defeat the interlock by a skilled technician in emergencies.

It shall be possible to close the switch only when it is in the correct position and the door is closed.

SDFU shall be supplied complete with DIN type, HRC fuses of suitable ratings and the fuse ratings in the SDFU are to be in line with load.

The SDF Unit shall be installed on MS Frame. MS item will be measured separately.

Mounting Nut shall be welded at rear side of the MS frame by proper marking and drilling.

One set of switch and cable end box shall be submitted to Engineer-in-Charge for approval before placing the order in bulk.

The SDFU shall be suitably designated (Numbering for SDFU, Source details) with letter size not less than 12 mm as directed by

Engineer In charge.

Danger boards/labels shall be provided by the contractor for all SDFUs.

1 No. adopter box with top cover made up of 2 mm thick sheet steel shall be provided for SDFUs of current rating less than or equal to 63A and 2 Nos. of adopter boxes shall be provided for each SDFU of current rating more than 63A.

The size of adopter box shall be equal in length and depth to size of sheet steel enclosure for SDFU. The height of the adopter box shall be as bellow.

Current rating of SDFU	Height of adapter box
63 A	150 mm
125 A	200 mm
250 A	300 mm
400 A	400 mm

S, I, T, C of MCB / RCCB / RCBO / MPCB

The rating and type of MCB / RCCB / RCBO / MPCB shall be as per the SOQ and shall be as per SLD of MCB DBs. The item selected shall be matching with MCB DBs.

Supply, installation, testing and commissioning are in the scope of this item.

15 VTPN DBs, MCB DBs, MCB Socket DBs, MCB enclosures, Switch boxes and Front modular plates

S, I, T, C of VTPN DBs

The scope of work includes Supply, installation, testing and commissioning of VTPN DBs with factory made metal enclosure, supply, assembling and installation of all the components of VTPN DB such as incoming and outgoing MCCBs, MCBs, neutral links, and other required accessories such as fixing bolts and nuts etc.

Please refer SOQ in Section VIII for number of 3phase outgoings in VTPN DBs, rating and type of incomer (MCCB/MCB), rating of MCB outgoings.

The MCBs used as outgoing switchgear shall be of 3-pole and minimum of 10kA rated.

In case of MCB incomer, the MCB shall be of 4 Pole and minimum of 10kA rated.

In case of MCCB incomer, the MCCB shall have over current, short circuit and earth fault protections.

In case of surface mounting, the enclosure shall be fixed on MS frame work. MS framework will be measured separately.

In case of embedment, the enclosure shall be flush mounted in the brick wall. The required chipping, packing, plastering and finishing is part of this item. Exposed surfaces of the embedded item shall be smeared with grease and temporary cover shall be fixed for the DB before plastering.

If required (as decided by the EIC depending on the surface conditions), one coat of red oxide primer and two coats synthetic enamel painting shall be done.

Assembling and installation of all the components and making the interconnections between them with suitable insulated wire size (6 or 10 Sq. mm) are in the scope of this item. All conductors shall have crimped terminations.

Earthing wires from external circuits shall be terminated to the earthing terminals of the enclosure as directed by the EIC. Copper wire used for earthing of the enclosure will be measured separately.

All the cables / wires inside the enclosure shall be neatly dressed using the PVC binding tape and buttons of adequate size. Proper size bunching tape shall be used.

Single line diagram shall be prepared, laminated sheet of SLD shall be fixed inside the double door by means of self thread screws.

Enamel 415V Danger boards of size 5" x 3" with scull symbol, minimum three languages (English, Tamil & Hindi) shall be supplied and riveted in front side of the DB door.

The DB and its outgoing and incoming switchgears shall be suitably designated as directed by Engineer In charge. Letters shall be painted in black colour using stencils as approved by Engineer-in-Charge. Markings with Permanent markers will not be allowed.

Cable end box shall be supplied and installed as specified in SOQ which will be measured separately.

S, I, T, C of MCB DBs

The scope of work includes supply and installation of MCB DB including supply, assembling and installation of all the components, including supply and installation of insulation tapes, sleeves, bunching tapes, etc making interconnections between the various components of the MCB DB and earthing connections, etc.

Cable end box shall be supplied and installed as specified in SOQ which will be measured separately.

Wiring for all the outgoing circuits from the MCB DB shall be done neatly with PVC identification ferrules provided indicating source and destination e.g.R1 – L1, L2. Suitable size copper crimping lugs shall be used for wiring and terminations. All conductors shall have crimped terminations / connections.

Please refer ***Clause 15.1.6 to 15.1.14*** for details of installation of MCB DBs.

Assembling, testing and commissioning of MCB DBs / VTPN DBs:

The enclosure has already been embedded in the wall / columns.

The contractor shall clean the mortar in the tapped hole of the embedded boxes using proper size of tap with adequate care so as not to cause any damage and supply and fix longer screws wherever required at no extra cost.

The contractor shall collect the accessories of the DBs from Department or from the civil contractor.

Per Phase Isolation (PPI) conversion kit shall be supplied and installed by the Contractor if it is included in the SOQ (section VIII).

Please refer ***Clause 15.1.8 to 15.1.14*** for details of installation of DBs.

S, I, T, C of MCB / RCBO socket DBs

The scope of work includes supply and installation of MCB / RCBO socket DBs with sockets, plug, inter connecting wires, making inter connection of components, earthing connections etc.

The metallic enclosure box shall be 7 tank processed and powder coated.

MCB / RCBO shall be supplied and installed by the Contractor if it is included in the SOQ (section VIII).

One sample piece in each type of enclosure with its components shall be submitted to the Engineer-in-Charge for his approval before taking up the purchase in bulk.

In case of surface mounting, the enclosure shall be installed on brick walls / columns as directed by the Engineer- in- charge.

In case of embedment, the box shall be embedded at suitable depth in brick work with knife edge finish and in flush with finished surface as directed by the EIC. Before installation the inner side of the box shall be smeared with commercial grade grease. After completion of plastering and painting of the building the grease shall be removed and boxes shall be cleaned properly. The required chipping, packing, plastering and finishing is part of this item.

The boxes shall be handled properly to avoid damages to the protective coating. In exceptional cases the damage to the protective coating shall be rectified as directed by the Engineer in charge.

It shall be identified with DB, Phase & Circuit Numbers in the method as approved by the Engineer-in-Charge. Letters shall be painted in black colour using stencils as approved by Engineer-in-Charge. Markings with Permanent markers will not be allowed.

S, I of MCB enclosures

The scope of work includes supply and installation of MCB enclosures, making earthing connections etc.

Please refer **Clause 15.4.4 to 15.4.8** for installation details.

S, I of PVC switch boxes

The scope of work includes supply and installation of PVC switch boxes.

Please refer **Clause 15.4.4 to 15.4.8** for installation details.

S, I of front modular plates

Supply and Installation of the following front modular plates on boxes embedded already in the wall as per the scope of work.

The Front modular plates with suitable fasteners of various

combinations are to be supplied and installed under this scope of contract. The boxes required for flush mounting of the above components have already been embedded in the wall.

The contractor shall clean the mortar in the tapped hole of the embedded boxes using proper size of tap with adequate care so as not to cause any damage. The contractor shall supply and fix longer screws wherever required at no extra cost.

The contractor shall assemble the various switches in the front modular plates as indicated in the electrical installation drawing.

Each Switch Boxes are to be identified with DB Name, Phase & Circuit Number in the method as approved by the Engineer-in-Charge. Letters shall be painted in black colour using stencils as approved by Engineer-in-Charge. Markings with Permanent markers will not be allowed.

Supply and installation of Modular plate with 20A starter & socket

Scope of work includes supply and installation of 1 No. of 25A socket and 1 No. of 20A Starter with 25 A plug top mounted on 1 No 4 modular plate or 2 Nos. 2 modular plates.

The boxes required for flush mounting of the above components have already been embedded in the wall / ceiling / beams / columns.

The contractor shall clean the mortar in the tapped hole of the embedded boxes using proper size of tap with adequate care so as not to cause any damage and supply & fixing of longer screws wherever required at no extra cost.

Each Switch Boxes are to be identified with DB, Phase & Circuit Numbers in the method as approved by the Engineer-in-Charge. Letters shall be painted in black colour using stencils as approved by Engineer-in-Charge. Markings with Permanent markers will not be allowed.

S, I of emergency push buttons in IP65 non-metallic enclosure

The scope of the work includes supply and installation of 1 No. of single position Key actuator push buttons mounted in IP65 non-metallic enclosure.

The box shall have enough clearance for termination of control cable.

S, I of hot dip galvanised / powder coated MS boxes

The scope of work covers supply and embedment of hot dip galvanised / powder coated (as specified in Schedule) MS boxes with required chipping, packing and plastering etc.

The boxes shall be made to sizes as specified in the SOQ and as per the Drawing No. IGC/ESD/9110/9000. The box and cover shall be made of 2mm thick sheet steel and size of the cover shall be exceeding the box by 10 mm on all sides. All joints of the box shall be made up of continuous welding and ground to remove any sharp edges.

The cover shall be fixed on the front side of the box by M5, 25 mm brass screws on self thread holes provided on the box. Triangular pieces shall be welded on all corners of the box for fixing the cover.

The box shall be provided with 2 nos. of M6, 25mm brass bolts with double nut and washers for terminating the earthing conductors. Knockouts shall be provided on the box for 25mm / 32mm dia conduit entry as per the drawing.

After the completion of all fabrication work, the boxes shall be cleaned of rust, loose scale, dirt, oil, grease and other foreign substances before hot dip galvanizing / powder coating. Thickness of the galvanizing / powder coating shall be uniform and not less than 80 micron.

In case of galvanization, it shall be carried out as per ***Clause 11.2.2***. In case of powder coating it shall be done after 7 tank processing and certificate of powder coating shall be submitted.

One sample piece in each type / size of boxes shall be submitted to the Engineer-in-Charge for his approval before taking up the purchase in bulk.

The boxes shall be handled properly to avoid damages to the protective coating. In exceptional cases the damage to the protective coating shall be rectified as directed by the Engineer in charge. The box shall be embedded at suitable depth in brick work with knife edge finish and in flush with finished surface as directed by the EIC with required chipping, packing and plastering etc. Before installation the inner side of the box shall be smeared with commercial grade grease. After completion of plastering and painting of the building the grease shall be removed and boxes shall be cleaned properly. In case of installation on MS frame / wall, the box shall be installed using GI fasteners with proper alignments as approved by EIC.

S, I of fan hook boxes

The scope of work covers fabrication, supply and embedment of fan hook boxes.

The fan hook box shall be fabricated as per the Drawing. No. IGC/ESD/9170/8009 and as detailed below.

The box shall be made out of 2 mm thick sheet steel free from scales, rust, etc and all the welds shall be continuous so as to avoid any leak of cement mortar while concreting.

The Box shall be 120 mm in dia., 75 mm deep and be provided with 2 Nos. collars of 3 mm thick welded to the box, with tapped holes suitable for M5 Screws.

2 Nos. knock outs of 25 mm and 2 Nos. knock outs of 32 mm to receive PVC/Metal Circular Rigid Conduit shall be provided around the periphery of the MS Box at equal distance for wire entry.

The fan hook shall be made out of 10 mm dia. MS rod (round steel rod) protruding out of the box and welded on to the fan hook box.

2mm thick rubber gasket to be provided between the box and the face plate. The diameter of the gasket shall be in line with the face plate.

The Box cover shall also be made out of 2 mm thick MS Sheet and are to be fixed to the box with M5 countersunk Brass Screws.

The box and cover plate shall be finished neatly without any sharp edges, burrs, etc and shall have good finish.

MS fan Hook Boxes shall be painted with 1 coat of primer and 2 coats of synthetic enamel paint.

A sample box shall be produced and got approved by EIC (Electrical) before bulk fabrication.

The box shall be embedded in RCC roof slab. Conduits entering the box shall be terminated with locknuts and extra holes in the box shall be sealed properly. The boxes shall be tied to the shutters with GI tie wires and nails to avoid entry of mortar in to the boxes.

S, I of Zinc Passivated / galvanised MS switch boxes

The scope of work covers supply and embedment of galvanised / Zinc Passivated (as specified in SOQ) Modular MS boxes with required chipping, packing, plastering, etc.

The switch boxes shall be concealed type, 50mm deep and as per the number of modules specified in SOQ. Knockouts shall be provided on all sides of the switch box for conduit entry and earthing terminals shall be provided inside the box for termination of earth conductors. Also the threaded provision shall be available in the box to fix the front modular plate.

The box shall be have provision for connecting 2.5 sq mm earth wire and knockouts for terminating the conduits.

Please refer ***Clause 15.10.7 to 15.10.8*** for procurement and installation procedure.

16 Light fixtures, occupational sensors and contactors for control

S, I, T, C of Light Fixtures

General requirements

Scope of work includes supply, transportation, installation, testing and commissioning of various types lighting fixtures with suitable lamps.

The type of light fixture shall be as per the SOQ (Section VIII). Unless and until specified in the SOQ, the light fixture along with the lamp shall be supplied by the Contractor. In case, the SOQ specify explicitly any component as free issue item, only that component alone will be issued as free issue item and all other components of the light fixture including the lamp, fixing brackets, fasteners, etc. shall be supplied by the Contractor for the completion of the work.

The supply cost does not include the cost of the lamp and the same is to be incorporated in the erection charges.

Sample of each of light fitting shall be submitted to Engineer-In-

Charge for approval before ordering in Bulk.

Quantities of the lighting fixtures are likely to vary to achieve the desired illumination level, effect and decor.

The unit rate quoted shall include supply of components required for installation of light fixture / fixing materials / fasteners etc. The contractor shall closely co-ordinate with the Engineer-in- charge and Civil Engineering Group personnel for installation of lighting fixtures in false ceiling areas.

The Contractor shall make his own arrangement for transportation of Lighting Fixtures to the work spot.

The contractor shall make own arrangement to reach the height to fix the fixture. However the ladder will be provided by the department depending on availability. Contractor shall make his own arrangement for transportation of ladder to the site and back to the storage area. Any damage caused to the ladder shall be repaired by the contractor free of cost.

The fixtures are to be tested before installing and in case low megger value is noticed after installing the fixture, the Contractor shall remove the fixture and get it replaced at no extra cost.

Lighting fixtures shall be identified with Name of the DB, circuit number and Switch No. (Eg. LDB1 R1 L18). Letters shall be painted in black colour using stencils as approved by Engineer-in-Charge. Markings with Permanent markers will not be allowed.

Required wiring connections shall be made by the Contractor as directed by the EIC. Wherever the lighting fixture cannot accept the looped wiring, approved make of terminal blocks shall be provided at the nearest pull box or junction box.

<u>Specification for electronic ballasts to be used with T5 or T8 fluorescent lamps</u>

The electronic ballasts shall have warm start / pre heat feature.

The electronic ballast shall have deactivation circuit to cut the power supply to the lamp at the End of Life (EOL) of the lamp and automatic reset once the lamp is replaced by new one.

Total Harmonic Distortion (THD) produced in the electronic ballasts shall be within the limit of 10% and shall comply with EN 61000-3-2 Standard

Electronic ballasts shall be of Radio Frequency Interference (RFI) suppressed complying with EN 55015 Standard

The electronic ballasts shall meet the safety requirements as per EN 60598 Standard

<u>Specification for T5 fluorescent lamps</u>

The T5 lamps shall be of 6500^{o}K colour temperature and colour rendering index (CRI) of more than 80%.

The lamps shall have a minimum efficacy of96 lumen/Watt at 35^{o}C for 6500K colour temperature.

T5 lamps shall have an average life of 20,000 hours and more at 3hr switching cycle (165 minutes on and 15 minutes off) – IEC cycle.

Specification for electromagnetic ballasts to be used with T8 fluorescent lamps

The electromagnetic ballasts to be used with T8 (36W / 40W) fluorescent lamps shall have the following limits.

Volts (V)	240
Frequency (Hz)	50
Nominal current without pf correction (A)	0.41
Nominal pf without pf correction (Cos ø)	0.5
Maximum power loss(Watts)	9
Maximum working temperature (Tw in ˚ C)	130
Maximum temperature rise (Ot in ˚ C)	70

The Ballast shall comply with the following standards:

Safety	:	IEC 920
Performance	:	IEC 921
Quality System	:	ISO 9001 Environmental Management System

A 4 µF± 5%, 250V Metallised Polypropylene (MPP) capacitor with dielectric film thickness of minimum 6 microns to be used with the electromagnetic ballast to improve the power factor to S 0.85. Capacitor shall be with metallic enclosure. The capacitor is also included in the scope of the item.

Specification for T8 fluorescent lamps

The T8 (36W / 40W) fluorescent lamps shall have the following limits.

Normal Life	S15,000 Hours
Colour rendering index (CRI)	S 80%
Lumen output at the end of life	S 80% of the initial value
Cap	G13
Lamp current (V)	103
Lamp (mA)	0.44
Colour	Cool day light
Colour temp. (˚k)	6500
Lumen output (Lux)	S 3250
Average luminance (cd/cm^2)	1.2
Mercury content	S 3mg

The lamp shall have reduced mercury absorption by the glass wall and the fluorescent powders to achieve improved lumen maintenance. It shall be suitable for conventional gear or HF gear

The light fixtures shall be mounted on the intended surface as per the specification and as directed by the EIC, all the accessories required for mounting the light fixtures are in the scope of this item.

Mounting requirements for indoor ceiling mounted fluorescent light fixtures

The light fitting shall be installed on ceiling with 2 Nos. ball &sockets, suitable length of 19mm / 20 mm down rod (down rod will be measured separately), 1.6 mm thick, 120 mm dia MS sheet to be

fixed on the ceiling to hold, the Ball & Socket.

The MS sheet and down rod shall be painted with one coat of red oxide and two coats of synthetic enamel paint as directed by Engineer in charge.

MS sheet, ball and sockets, consumables such as nylon sleeves, brass screws, terminal blocks and copper lugs are included in this scope. However down rod will be measured separately.

Mounting requirements for surface (ceiling / wall) mounted CFL / LED light fixtures

These types of light fixtures are to be fixed directly on the surface of ceiling or wall as per the schedule.

Supply of fixing screws & all other materials required for this item are included in the scope of this item.

In case of LED fixtures Tender No. and date of supply shall be stencilled on the rear side of each fixture.

Mounting requirements for surface mounted fluorescent light fixtures

The installation shall be made either using ball and sockets arrangement or angular mounting arrangement as decided by the EIC depending on the site conditions.

In case of ball socket arrangement, the light fixture shall be installed on wall with 2 Nos. Ball & Sockets, suitable length of approx 100 mm,19mm / 20mm Nipple and 2mm thick, 120mm dia MS sheet to be fixed on the wall to hold, the Ball & Socket. The MS sheet shall be painted with one coat of red oxide and two coats of Synthetic enamel paint as directed by Engineer in charge. Consumables nylon sleeves, brass screws, terminal blocks and copper lugs are also included in this scope.

In case of angular mounting arrangement, it shall be made as directed by the EIC using 40x3mm MS strip painted with one coat of red oxide primer and two coats of synthetic enamel paint.

1 No. 6A, 230 V, 3Plate jumbo ceiling rose and 3Cx1.5 Sq. mm flexible cable of required length shall be provided.

Mounting requirements for recess mounted / suspended light fixtures

These luminaires shall be supported diagonally through 2 Nos. 6mm GI coated MS Rods or suspended with SS wire with suitable anchor fasteners from ceiling as approved by EIC.

Wherever required 25mm dia corrugated PVC flexible hose approximate length of 2Mtr and 2 Nos. of suitable size Heavy duty PVC Gland shall be supplied and installed to run the lighting control wires.

Supply of PVC flexible hose, PVC gland, GI threaded rods/ slings and anchor fasteners are included in this scope.

The scope of this item include making the required opening without damaging the false ceiling. In case the light fixture and tile dimension matches the contractor shall remove the tile if already installed and

store it as directed by the EIC. Care shall be taken to avoid damage to the false ceiling or the grids during installation of light fixtures. Damages if any caused shall be rectified.

Mounting requirements for batten type light fixtures

These luminaires shall be installed on teakwood round block. 2 Nos. of teakwood round blocks and 1 No. 6A, 230 V, 3 plate jumbo ceiling rose & 3 Core x 1.0 Sq.mm flexible copper cable required for wiring etc. shall be supplied by the contractor. The contractor has to test the luminaires before and after installation.

Before mounting the round blocks the exteriors and interiors shall be given TWO Coats of wood primer and One Coat of IVORY synthetic enamel paint.

Consumables like nylon sleeves, brass screws, terminal blocks and copper lugs are included in this scope. Identification of installations shall be marked by the contractor at no extra cost.

Mounting requirements for High-bay light fixtures – pendent type

These luminaires shall be suspended from fan hook box already embedded on the ceiling or GI ceiling mounting brackets to be installed which will be measured separately.

The luminaires shall be suspended by means of “S” hook and chain arrangement approved by EIC.

Mounting requirements for Area / Street light fixtures

The scope includes installation of light fixtures over street light poles of height from 7m to 11m and also post of lantern from 3m to 5m.

Necessary fasteners shall be provided to suit the lighting fixture.

Wherever the mounting pipe length or dia doesn’t suit the fixture, modification of mounting arrangement shall be made as directed by the EIC.

Mounting requirements for Bulkhead light fixtures

The light fixture shall be mounted on the wall or ceiling as the case may be. Wherever embedment is mentioned the base of the fitting shall be embedded as directed by the Engineer-in-Charge.

Necessary fasteners shall be provided to suit the lighting fixture.

In case of SOQ refers to supply and installation of bulkhead fittings, the luminary with lamp shall be supplied and installed by the contractor and it involves no free issue material.

In case of SOQ refers to supply and embedment of bulkhead fittings, the luminary without lamp shall be supplied and installed by the contractor. Parts of the fitting as directed by the EIC shall be removed and handed over to the department for safe custody.

In case of SOQ refers to assembling and commissioning of bulkhead fittings with supply of lamp, components of the luminary will be issued by the department free of cost and the same shall be installed by the

contractor. Also, required lamp shall be supplied and installed by the contractor.

Assembling and installation of lighting fixtures

The luminary, ballast and lamp will be issued by the Department as free issue Item. The scope of work includes transportation of luminaires from IGCAR/GSO Stores Kalpakkam, assembling and installation of luminaires.

Please refer to ***Clause 16.1.1.6 to 16.1.1.11*** for general requirements for installation of luminaires and ***Clause 16.1.6 to 16.1.13*** for mounting requirements of the luminaires.

S, I, T, C of occupancy sensors

Occupancy & day light surface / flush mounted sensor of type & model as specified in SOQ shall be supplied by the Contractor.

All the materials required for fixing and termination of wiring in the sensors is in the scope of this item.

In case of surface mounting, the sensor shall be fixed on the ceiling or wall with suitable PVC adopter box as required.

In case of recess mounting, the sensor shall be fixed on false ceiling as per ***Clause 16.1.9.2 to 16.1.9.4***

After completion of installation the sensors shall be tested and commissioned as per the procedure given by the OEM and as directed by the EIC.

Whenever required fine tuning of sensors shall be done by the contractor as directed by EIC.

S, I, T, C of 1 pole contactor with terminal Blocks

The scope of work includes supply, installation, assembling testing &commissioning of 25 Amps, single pole contactor with coil voltage 240 Volts, 6 Nos 660 volt, 6amps connecting terminal with required dinned rail in sheet steel enclosure already embedded on brick wall.

The contractor shall clean the mortar in the tapped hole of the embedded boxes using proper size of tap with adequate care so as not to cause any damage and supply and fix longer screws wherever required at no extra cost.

The contactor will be used for auto control of single phase heavy electrical loads through occupancy sensors.

S, I of GI down rods

The scope of the item covers supply, cutting to required length, threading, painting and installation of 20mm dia heavy duty GI conduit down rods required for installation of light fixtures.

Please refer ***Clause 27.6*** for detailed specification of heavy duty GI conduits.

The length of conduit varies according to site conditions depending on the height of mounting the light fixtures as directed by the EIC.

Threads suitable for fixing ball and socket / check nut shall be provided on both sides of the conduit.

The conduit shall be painted with one coat of primer and two coats of white enamel paint well before the installation.

17 Fans & Air - circulators

S, I, T, C of ceiling fans

Specification for ceiling fans

Ceiling fans of sweep length as specified in SOQ shall be supplied. Refer to the following table for technical details.

DESCRIPTIONS		SPECIFICATIONS		
A. Motor				
1.1 Type		AC single phase permanent split capacitor type		
1.2 Rated Voltage		220-240 V		
1.3 Rated Frequency		50 Hz		
1.4 Performance		1400mm fan	1200mm fan	900mm fan
At 230V	Air delivery in CMM	230	225	230
	Power input in Watts	76	55	63
	Power factor	0.9	0.98	0.9
	Speed in RPM	325	335	400
At 200V	Air delivery in CMM (Minimum guaranteed value)	208	200	210
	Power input in Watts (Maximum guaranteed value)	68	44	55
	Speed in RPM	305	316	380
At 180V	Power input in Watts	58	38	48
	Speed in RPM	280	299	340
1.5 Winding insulation		' B ' class		
B. Body / Blade / Bearing				
2.1 Bearing – Top & Bottom		Ball type		
2.2 Appearance - Colour		Matt Brown		
2.3 Blade - Material		Aluminium		
2.4 Blade – Thickness		1.1 mm		
2.5 Down rod – Length		260 mm		
2.6 Motor cover - Top		Aluminium		
2.7 Motor cover - Bottom		Aluminium		

The ceiling fan shall be tested as per IS - 374 and performance at 200 V should be minimum guaranteed.

The body of the motor, blades, canopies, and down rod shall be of same colour – Matt brown finish.

I,T, C of ceiling fans

Scope of work involves transportation of ceiling fans from Electrical Store IGCAR/GSO/ Anupuram to actual location, installation, testing and commissioning.

All the Ceiling Fans shall be assembled and tested prior to installation, to ensure that the IR Value is satisfactory and is running without any abnormal noise or vibration. All the fans shall be earthed as envisaged under fan point wiring.

Phase, Neutral and Earth wires for the Ceiling Fan will be terminated in a 3 Way Terminal Block in the Fan Hook Box. Further, PVC insulated and sheathed, 3 Core x 1.5 Sq. mm stranded

copper conductor flexible cable of suitable length shall be supplied and connected from the Fan Hook Junction Box to the terminals of the Ceiling Fan at no extra cost.

Wherever the length of down rod is more than 300mm it shall be provided by the contractor and will be measured as separate item.

The ceiling fan is provided with safety rope suitable for 300 mm down rod. Where ever the down rod is more than 300 mm the contractor shall supply and provide suitable safety rope of the same material as the original one without anyextra cost.

Unused original 300mm long down rod and steel rope shall be returned to Departmental stores as directed by Engineer In charge

S, I, T, C of wall mountable type heavy duty exhaust fans

Specification for wall mountable type heavy duty exhaust fans

The scope of work includes supply, installation, testing and commissioning of single phase, turbo heavy duty industrial type exhaust fan confirming to IS 2312 with GI gravity Louvre, Stainless Steel Bolts for mounting of Exhaust Fan and 3C x 1.5 Sq. mm HRPVC insulated & sheathed copper flexible cables of required length with 6A, 3 pin plug top with indicator.

Please refer SOQ for rating of exhaust fans. The exhaust fans shall be confirming to IS 2312.

The performance characteristics of the exhaust fan shall be as per Table 2 of IS 2312. The following table gives the select details from that.

Table 6

Exhaust fan diameter in mm	Speed in rpm	Air delivery in cubic metre per hour	Maximum power input in watts
300 (12”)	1400	1710	90
380 (15”)	1400	3250	160
450 (18”)	1400	6120	410

The blades shall be non-corrosive type and dynamically balanced for vibration free rotation. The body shall be made of die-cast Aluminium to ensure long life. The exhaust fan shall be ISI certified. The louvers shall be GI gravity Louvers.

I,T, C of wall mountable type heavy duty exhaust fans

Exhaust fans are required to be installed on to the opening provided for this purpose. Exhaust fans shall be fixed with 6/8 mm stainless steel bolts to be grouted with suitable anchoring arrangement as suggested by the Engineer-in-Charge in the wall prior to the installation for fixing the exhaust fans/louvers.

All the exhaust Fans shall be assembled and tested prior to installation, to ensure that the IR Value is satisfactory and is

running without any abnormal noise or vibration.

All the exhaust fans shall be earthed as envisaged under exhaust fan point wiring.

If any MS Item involved in this work except SS Nut & Bolts will be measured as separate item on weight basis and all other materials required to complete this work is covered in this scope of work.

The contractor shall test the fans for IR value and functionality as directed by EIC.

S, I, T, C of heavy duty pedestal fans

The scope of work includes supply, installation, testing and commissioning of heavy duty pedestal fans. The fan shall be made up of powerful heavy-duty motor to operate at 230V AC. It shall have 90^0 horizontal oscillation and vertical adjustment from 22^0 to 45^0. The fan shall have sturdy close-mesh guard.

The blade shall be non metallic for sizes upto 400 mm sweep and Aluminium alloy for higher sizes. Performance of the pedestal fans shall conform to the following table. The technical data sheet of the pedestal fans shall be submitted for approval of EIC.

Table 7

Fan size in mm	Minimum air delivery in cubic metre per minute	Maximum power input in watts
300	30	40
400	65	61
500	90	90
600	150	137

The contractor shall test the fans for IR value and functionality as directed by EIC.

S, I, T, C of wall mountable heavy duty (industrial) air circulators and light duty fans

Specification for heavy duty wall air circulators

The scope of work includes supply, installation, testing and commissioning of heavy duty wall mounted type air circulator confirming to IS 2997. The fan shall be made up of Heavy Duty motor and with 3 numbers of Aluminium alloy one piece blade, double ball bearing, 90o oscillation, the fan shall have sturdy close-mesh guard.

The performance characteristics of the air circulators shall be as per Table 3 of IS 2997. The following table gives the select details from that.

Table 8

Minimum size of fan in mm	Air delivery in cubic metre per minute and distance of anemometer	Maximum power input in watts	Minimum peak velocity in m/min
450	125 Cu. m @ 2700mm	100	245
600	250 Cu. m @ 3600mm	200	245
750	370 Cu. m @ 4500mm	250	245

Specification for light duty wall mountable fans:

Parameter	Specifications
Sweep (Dia of Blade)	385 mm ± 5 mm*
Rated Voltage	230 Volt
Rated Frequency	50 Hz
Power Factor	0.9 minimum
Motor Type	AC Single phase Capacitor Start & Run Motor
Insulation Class	E
Safety Parameters	
High Voltage Test of Motor	To withstand 1500 Volt
Insulation Resistance	>2M▲
Leakage Current	<210µA
Winding Fuse Rating	135◦ C Resettable

Performance Test Parameters							
Min Starting Voltage at highest speed and oscillation ON	130 V						
Minimum speed in RPM	Voltage	180V	200V	230V			
	Speed switch	High	High	Low	Med	High	
	Min. RPM	1020	1120	900	1000	1280	
Power Input (in watt) at 230V High speed	S55 + 20%						
Temperature rise of winding at 230 Volt	70K max						
Speed Regulation	Pulling switch						
Air Delivery	67 ± 10% m3/minute						
No. of oscillation per minute	4 minimum						
Degree of oscillation	85°(angle b/w 2 extreme position left to right)						
Oscillation	Smooth & jerk free at all 3 indexing position						
Vibration & Noise	No Vibration/ abnormal noise in any position at different testing voltages						
Running Test for 4 hours at 230 V	For 4 hours						
Measureable Parameters							
Supply cord length (Outside the fan)	1.7 m(minimum)						
Lamination Stack height	25mm ±0.5mm						
Blade weight	0.155 Kgs ± 10%						
Blade material	PP						
No. of spokes in front and rear guard	Front Guard - 120 nos., Rear guard 120 nos.						
Visual Inspection of Product & Packing							
Capacitor Value	1.5 mfd						
Regulation type	Tapping winding						
Bush Bearing	Sintered metal powder bearing						
Label-rubbing/Tape test	Shall not smudge/deplete						
Overall finish of fan	Fan should be dust free/scratch free/dirt free /Flashes free/free from wire damage/crack free.						

all be installed on wall / MS structure according to site conditions as directed by the EIC. All fixing materials shall be supplied by the contractor. MS item if involved will be measured separately.

The contractor shall test the fans for IR value and functionality as directed by EIC for all fans covered under this item.

S,I of hot dip galvanised mounting bracket for ceiling fan

Scope of work includes supply, fabrication and installation of ceiling fan mounting bracket made out of 100 x 100 x 10 mm MS sheets and 10m dia MS plain rod as per Drawing No. IGC/ESD/9170/8010. Rerolled MS items shall not be used.

Installation of mounting bracket on Flat type roof using anchor fastener of size 8 mm. Bolts consist of nuts, plain and ring washers.

Electric arc welding only should be used for fabricating the supports. Welding of any component/part to the other shall be only by full welding and Tack Welding will not be accepted. Sharp edges should be ground smooth using a grinding wheel the as directed by the Engineer-in-Charge.

After completion of the fabrication entire lot shall be galvanised after cleaning by 7 Tank process. Thickness of the GI Coating shall not be less than 75 microns.

A Sample of ceiling mounting bracket shall be got approved by the Engineer-in-Charge prior to fabrication of the item in bulk.

S, I, T, C of wall mountable fans (non-industrial type)

The scope of work includes supply, installation, testing and commissioning of wall mounted fans. The fan shall be 90^{o} oscillation type and provided with sturdy close-mesh guard.

The fans shall be installed on wall / MS structure according to site conditions as directed by the EIC. All fixing materials shall be supplied by the contractor. MS item if involved will be measured separately.

The contractor shall test the fans for IR value and functionality as directed by EIC.

18 Point Wiring for Light/Power/Fans /Sensors/Telephone/LAN including supply of wire

Note – 1: Wire cost to be included in erection charges.

***Note – 2*: Generally the ceiling height will be 3 to 3.75 m from the FFL. For Utility areas ceiling height will be upto 5.5m from the FFL. However please refer the relevant drawing for exact details.**

Single core copper flexible cable, PVC / FRLS PVC (As per the schedule) insulated 1100V grade conforming to latest BIS only shall be used for wiring and earthing.

The insulation of Phase, Neutral and Earth wires shall be of Red / Yellow / Blue / Black / Green. Coloured sleeves are not permitted.

Blank Plates shall be provided wherever necessary to mask the openings not used. The Contractor shall ensure that the enclosure is dust and vermin proof on completion of the installation.

All conductors shall have crimped terminations. Wiring for all the outgoing circuits from the MCB DB shall be done neatly with PVC identification ferrules provided indicating the originating phase and the terminating light/fan/power point designation e.g. R1-L1, L2 etc. All the Wires inside the DB shall be neatly dressed using PVC binding tape and buttons of adequate size.

Lighting and power circuits shall be provided with Earth wire of size 2.5 sq.mm

No joint is permitted between source and destination points.

Each circuit shall have independent Phase, Neutral and Earth wires from MCB DB to Switch Box and looping of Neutral / Earth wires between circuits are not at all permitted.

The switches provided for lighting shall be 10 A rating and the total connected load shall not exceed 750 Watts.

Similarly the total connected load controlled by 16 A switches shall not exceed 1200 Watts.

16 A MCB control shall be provided for high bay lighting fixtures (250 / 400 W) / wall mounting air circulators.

The wires shall be terminated at both ends with crimping type tinned copper lugs and the lugs shall be pin / fork / ring type to have effective connectivity. Both ends of wire for both phase and neutral shall be provided with lockable identification ferrules depicting the colour of phase
/ neutral, circuit number of MCB and Switch No.

For Telephone points, tinned copper flexible cable having twin twisted cores with PVC sheath shall be provided and the conductor dia shall be 0.71 mm minimum. Each telephone point shall have 1 run of 2 pair or single pair as mentioned in SOQ, twin twisted tinned copper cable from Telephone DB to facilitate intercom and outside connectivity.

Location of DBs, Switch Boxes and Circuit details are tentatively given in the enclosed drawing, based on which rates for point wiring may be quoted.

For point wiring wherever concealed wiring is envisaged, conduits, switch and socket outlet boxes, junction boxes and pull boxes are already embedded.

The scope of work includes cleaning of embedded conduits, switch boxes, pull boxes, wiring, mounting the loose components like switches, sockets, covering the embedded boxes with Anodised Aluminium / Hylem covers and earthing with all necessary modifications / fabrications of mounting supports in the MS boxes, if necessary.

Painting the interior of Switch boxes, pull boxes, DB boxes with one coat of red-oxide primer and two coats of white synthetic enamel paint is in the scope of Contract.

All materials required for this item are to be supplied by the contractor.

The wiring for Lighting / Power / Fans will be generally measured on the basis of point wiring using 1100 V Grade PVC / FR PVC / FRLS PVC (As per the SOQ) insulated Stranded Copper Wire of various sizes as described elsewhere in this specification.

The entire quantity of wires to be supplied under this contract shall have an embossing ‘‘DAE
– KALPAKKAM’’ along the length of the wire at every 1 metre interval preferably.

Minimum stranding size of the cables shall be as follows:

- 1.5 Sq.mm ... 22/0.3 mm

- 2.5 Sq.mm ... 36/0.3 mm
- 04 Sq.mm .. 56/0.3 mm
- 06 Sq.mm .. 85/0.3 mm
- 10 Sq.mm .. 140/0.3 mm

Stranding details shall be as per IS: 694 & IS: 8130.

The cables mentioned above shall be offered for Pre-dispatch inspection at the manufacturers premises. Purchaser at his discretion can waive off the pre dispatch inspection based on acceptance of test certificates.

Wiring for information outlet points shall be wired with 1 Run of Cat 6, 4 Pair and unshielded Twisted Pair (UTP). The UTP cable having solid bare copper wire, HDPE insulated over conductor, paired, flexible, blue or grey PVC jacketed are to be supplied. The UTP cable shall conform to the technical specifications in Table 9. It will be measured on the basis of point wiring as indicated in schedule of quantities.

Table 9

Technical Specifications	
Product Description	UTP CAT6 cable, 23AWG 0.57mm LAN cable/messenger wire. The cable should have 200m transmit capability for 1000MBS bandwidth.
Reference standard	UL444, TIA/EIA-568B, Bare solid copper conductor with ROHS complied PVC, PE or LSOH jacket Complies to TIA/EIA-568B&ISO/IEC 11801
Marking	Sequentially metre marked at every ONE metre intervals
Packing:	1) Packing Lengths: 305m/roll one box. 2) Inner packing: Wooden reel, plastic reel 3) Outer packing: Carton box, pull out box

Draw wires have already been provided in the conduits. In case the draw wire is not available the contractor shall make necessary arrangement to draw the wires at no extra cost.

Threads of collars of the embedded metallic switch boxes, pull / junction boxes etc., shall be cleaned using tap & screw. If the collars of the embedded switch / pull boxes are broken / missing the contractor shall replace the same at no extra cost.

All materials such as FRLS PVC / FR PVC insulated single core flexible copper wires, copper crimping lugs, identification ferrules, PVC insulation tape, PVC grommets, etc shall be supplied by the Contractor.

Fixing of switches, socket outlets etc., will be covered under point wiring as per the schedule.

Documentary evidence for authenticity of supplied wires shall be produced.

Cables shall be tested at manufacturer's premises before despatch.

All copper conductors will be terminated with crimped copper lugs.

Power point wiring of exhaust fans includes wiring from DB to the switch provided at operating height and to the socket outlet near the exhaust fan provided at elevated levels.

Cables shall be colour coded for phase identification and ferrules for circuit identification will be provided at both ends.

Termination of earthing leads at DBs, switches, sockets, lighting fixtures, ceiling fans, exhaust fans and Air circulators are covered under this scope of Point wiring.

14 SWG Copper wires have been wound and run along with each metallic conduit from the Distribution Board to all the Pull/Junction/Switch Boxes in case of Public Buildings. The Contractor shall clean and terminate the bare copper wires with suitable lugs, if necessary, etc. on to the earth terminals available in the Pull/Junction/Switch Boxes as directed by the Engineer-in-Charge.

The Contractor shall also check and ensure that the earth wire available on each Pull/Switch/Junction/Way Box has continuity to earth. Otherwise he shall establish earth continuity from the nearest Pull/Switch/Junction/Way Box by running 14 SWG Copper wire at no extra cost.

2.5 Sq.mm Earth wire (Green colour) shall be bolted with earth pins of sockets and light fixtures and all other points except telephone and LAN points.

Secondary points will be looped from primary points or adjacent secondary points as indicated in the drawing. Interconnection between the lighting fixtures mounted together will not be treated as secondary point and shall be included in the scope of primary point only.

Looping will be permitted only at terminals of switches, sockets or lighting fixtures. Wherever looping at terminals is a not possible, crimped /soldered joint near terminals with Raychem/3M insulated sleeve may be permitted as decided by Engineer-in-charge.

Point wiring looped from one control switch to another control switch shall be one wire (Phase alone) and will not be measured separately, if they are located in adjacent boxes or within the same box.

All wiring shall be identified at either end with designated ferrules. Lights, fans and other equipment also will be identified by the designation indicating the originating phase, circuit and equipment reference as assigned in the drawing / by the Engineer-in-Charge.

Wires of RED, YELLOW, BLUE for phases, BLACK for Neutral and GREEN for earth shall be used for identification. . In case of 10 Sq.mm Wire which is not available in different colours the PVC Sleeves of various colours will be permitted near the crimping lug. PVC ferrules for circuit identification shall be provided at both ends.

All fixing fasteners and washers shall be of brass. All the embedded conduit junction boxes shall be covered with PVC / MS / Hylem Cover plates which shall be fixed by the contractor. In embedded conduit junction boxes if the fixing holes are damaged, PVC / MS / Hylem cover plate shall be fixed on to the ceiling / wall with suitable nylon sleeve & brass screws , likewise wherever the conduit junction boxes

have got embedded deep, brass screws of adequate length shall be provided to fix the cover at no extra cost.

Switch Boxes if any found without seating clamps & cleats, it shall be provided by means of welding.

PVC Bushes shall be provided for all conduit terminations before pulling wires through the embedded conduits.

The contractor shall clean the mortar in the tapped hole of the embedded boxes using proper size of tap with adequate care so as not to cause any damage. The contractor shall supply and fix longer screws wherever required at no extra cost.

The contractor shall assemble the various switches in the front modular plates as indicated in the electrical installation drawing.

Each Switch Boxes are to be identified with DB Name, Phase & Circuit Number in the method as approved by the Engineer-in-Charge. Letters shall be painted in black colour using stencils as approved by Engineer-in-Charge. Markings with Permanent markers will not be allowed.

All fixing fasteners and washers shall be of brass.

For power points covered under this contract, Phase, Neutral and Earth wires of specified size shall be run separately for each circuit from the MCB DB to each Light / Power point and not to be tapped off from other circuits.

After completion of wiring, holes provided on work stations for taking the wires shall be properly sealed to avoid entry of dust, insects etc.

The contractor shall provide PVC covers of larger dia and cover fixing screws for all the conduit junction box openings.

In case SOQ (Section VIII), specifies that the wiring to be measured on per meter basis, payment will be made on the basis of length of wire instead of point wiring.

In case where SOQ (Section VIII) refers to free issue items, those components specified as free issue only will be issued by the Department free of cost and supply of all other components required for completion of the job are included in the scope of the contract.

19 S, I of perforated type GI cable tray:

The Scope of work involves supply and installation of hot dip galvanised perforated cable tray of size as per schedule with Cross / Tee joint and bends as directed by Engineer-in-charge.

Specification for supply of cable trays

Construction

Channel Formation including sides & base shall be shaped from Perforated 2mm thick MS Sheet.

The tray shall be single sheet without welding. The sheet shall be bent properly such that there is no deformation.

The holes shall be free from sharp edges and burrs and the flat surface shall be smooth to prevent any damage to cables.

All corners of cable tray shall be smooth with radius approximately 6 mm.

Runners shall be provided with slotted holes for clamping cables.

The straight length of each cable tray shall be 2.5 Mtrs.

Holes of 12 mm dia shall be provided at each end of cable tray side members for clamping with side couplers.

Tapped holes of dia 5 mm at equal intervals shall be provided on top of the side members to install covers. Holes of 10 mm dia shall be provided on the side members for running Earth Conductor.

Details of accessories

Accessories include Cross, Tees, Reducers, Horizontal long bends, Vertical long bends (Inside & Outside), couplers, etc. All accessories shall be of 2 mm thick hot dip galvanised MS.

The side coupler plates shall be made from 14 SWG MS Sheet and provided with 2 circular holes & 2 oblong holes.

Galvanising

All Cable Trays and Accessories including coupler plates, bolts, nuts and washers shall be Hot Dip Galvanised after fabrication according to IS 4759.

The galvanizing shall be uniform, clean, smooth and continuous and free from any acid spots.

The quantum of zinc deposit shall not be less than 610 gms per Sq. Mtr of surface area and the coating thickness of zinc deposit at any spot shall not be less than 80 microns.

Tests

The following tests shall be carried out at the premises of manufacturer in the presence of Departmental Representative

a) Deflection test
A uniformly distributed load of 100 kg per metre shall be applied over each type of tray which is supported at both ends. The maximum deflection at mid span shall not exceed 7 mm. This test will be carried out on each type as well size.

b) Samples at random shall be tested for coating thickness as required in IS.

c) Dimensional checks.

d) Rigidity of welds on trays and other accessories.

Installation of cable trays

The Contractor shall visit the site, assess the quantities of all accessories required such as Cross, Tees, Reducers, Horizontal long bends, Vertical long bends (Inside & Outside), couplers as per the site requirements and make the cable tray route layout and submit it for the approval of EIC.

Each section of trays shall be provided with 2 side coupler plates & associated bolts with nuts.

The MS support frames for installing the cable trays shall be installed in line and levels as per the approved drawing of cable tray layout and as directed by the EIC. The distance between MS support frames shall not exceed 1 metre.

The MS support frames shall either be grouted in to the brick walls or fixed by anchor fasteners on RCC walls or welded to the EPs provided. MS item required for this will be measured as separate item.

The cable trays shall be installed over MS support angle frames and fixed by suitable GI fasteners.

No separate measurement will be done for accessories; it will be measured as part of tray length in metres. Length of tray will measured on the centre line of the tray.

20 Fabrication, supply and fixing of wooden notice boards

Scope of work includes Supply and fixing in position 'notice board' of size about 2000 x 900x 100 mm consisting of Teak Wood (First quality) frame of size 50 x 60 mm, provided with Two Nos. Sliding Glass Door shutters of 5.5 mm thick with necessary Aluminium Channel Sections, commercial plywood of 12mm thick backing with 12mm soft board with approved fabric, locking device, etc. as directed by the Engineer-in-Charge.

Notice boards are to be installed inside indoor substation as directed by the EIC.

21 Fabrication, supply and fixing in position of wooden Key Boards

Scope of work includes Supply and fixing in position of Key Boards made out of Teak Wood (First Quality) provided with Two Nos. Sliding Glass Door shutters fitted in Teak Wood frame work and Locks with duplicate Keys. The doors shall be fitted with suitable rollers/ bearing and shall slide in a suitable Aluminium rail for easy movement. The overall Dimensions shall be 1200 x 600x 100 mm; 60Nos. Brass Hooks shall be fixed for the Key Hooks as directed by the Engineer-in-Charge.

Wooden Key Boards are to be installed inside indoor substation as directed by the EIC.

22 S, I of fire buckets and stands

S, I of fire buckets

The fire buckets shall be confirming to IS 2546.

All gas welds shall be free from porosity, blow holes and brittleness. All parts of the buckets shall be finished smooth and sharp edges rounded off.

The fire buckets shall be filled with clean dry river sand and positioned at locations identified by EIC.

S, I of fire bucket stands

The fire bucket stand shall be made as per drawing No. IGC/ESD/4012/3021/1 from medium duty 50NB GI pipe confirming to IS 1239.

The stand shall be provided with canopy made of 2mm GI sheet steel for the entire length of the stand as shown in the drawing.

After completion of fabrication the stand shall be painted with two coats of Poly Urethane paint of 'post office red - 514' shade. The PU painting shall be done as per ***Clause 11.3***.

The word 'FIRE' shall be painted in black and Tamil translation centrally on the outer surface of both sides of the canopy.

The stand shall be transported and positioned at locations identified by the EIC.

23 S, I, T, C of 3 HP self priming mono block pumps

Scope of work includes Supply, transportation to site, installation, testing and commissioning of Three phase, 415 volts, 50 Hz, 3.0 HP, 2900 RPM Motor with self priming mono-block pump, CI construction with CI Impeller, Gland packed pump as directed by Engineer-in-charge.

One set of Foot valve and Top up valve shall be supplied and installed for each pump set.

The pump set shall be installed with MS frame and this frame shall be grouted on the floor properly. MS required for the foundation will be measured separately.

Necessary equipment earthing shall be completed before testing the pump. Copper required for this purpose will be issued as free issue item and the contractor shall install it.

GI pipes associated with this work will be measured as a separate item on metre basis.

24 S, I of 2 section FRP pultruded telescopic type, class 'F' insulation HT earth discharge rod

Scope of work includes supply of high voltage discharge rods with wire stranded copper conductor leads and accessories and installed at various substations with suitable clamps on walls as directed by Engineer-in-charge.

The rods shall be made up of fibre reinforced plastic materials without voids. The rods shall be extendable up to 10 feet long and the radial gap between two sections shall be minimum so as to avoid oscillation when extended.

The entire quantity of discharge rods shall be tested as directed by the EIC. The connecting lead / wire shall be insulated, stranded 6 Sq. mm copper of length 5 m as directed by Engineer-in-charge.

Socket for clamp end and Crocodile Clip for earth end with soldered ends shall also be supplied under this item.

25 S, I of electrical insulation mat

The scope of work includes supply of electrical insulation mat complying with IS 15652 & SOQ and installation of the same in various sizes and lengths as per the site requirements.

Material of the insulation mat Rubber compound of High quality natural rubber with high electrical insulation grade. Colour of insulation mat shall be Blue and width shall be 1m. The mats shall have chequered anti skid surface on one side and plain at the other side. The insulation mats shall be free from pin holes, cracks, blisters, cuts, voids, prominent ripples. Mats shall be of corrosion resistance and oil resistant.

The mats shall be marked with manufacturer's identity, voltage class, mfg. date. The date of manufacturing shall not be more than 1 year from the date of delivery.

The contractor shall produce a set of type test certificate. Entire quantity / samples shall be tested as per IS 15652 at manufactures works before dispatch to site.

After proper cleaning of floor, the mat shall be pasted to the floor uniformly with branded adhesives without any air traps. All the edges of the mat shall be pasted with the Yellow colour adhesive tape. The insulation mat shall be protected from scratch or damage during installation.

26 Supply and pouring of plain cement concrete

The scope of the work includes supply, pouring of plain cement concrete of ratio as specified in SOQ and curing for 7 days.

The area intended for pouring of PCC shall be excavated and required shuttering shall be provided by the contractor at no extra cost.

In case of filling up of road cutting by PCC, the road shall be made good to the original level as directed by the Engineer-in-charge.

27 S, I of GI / PVC conduits

Common specification

(This section is applicable for all the sub-section under ***Clause 27***)

All materials required for completion of the work including conduits, round JBs, inspection bends, long bends, check nuts, couplings, reducers, 14 SWG copper wire, 0.8 mm thick copper clamps, 16 SWG GI wire etc. are included in the scope of this item. In case of PVC conduits, 14 SWG copper wires & 0.8 mm thick copper clips are not in the scope of this item. Also if the SOQ (section VIII) refers any of these as free issue item, that item only will be issued by department as free issue item and all other items required for completion of work shall be supplied by the contractor.

Please refer ***Clause 27.6 & 27.7 / Clause*** **0** ***& 27.9*** for detailed specification of heavy duty GI / PVC conduits and accessories respectively.

The accessories shall be used to suit the site conditions and as directed by the EIC.

Conduit Junction Boxes shall be provided near every bend, every 6 m in straight length and for fixing the light fixtures (2 Nos. for each fluorescent light fixture or tubular LED/ 1 No. for other types of light fixtures).

2 / 3 / 4 way JB shall be provided according to the requirements and unused holes of the JB shall be blocked properly.

Check nuts shall be provided on both inside and outside of the enclosures where the conduit is getting terminated.

16 SWG GI pull wire shall be provided for the entire length of the conduit with 200 mm loose extending out from the JBs / DBs / switch boxes.

After providing GI pull wire, all the covers of JBs / inspection bends etc. shall be closed.

No separate measurement will be taken for conduit bends/ check nuts/ couplers/reducers. It is included in the conduit measurement.

In case of GI conduits, offsets wherever required shall be carried out with smooth bends using conduit bending machine. 14 SWG copper wire shall be helically wound over the entire length of GI conduit pipe and fastened by 0.8 mm thick copper clips with brass nuts and bolts at every 1m distance.

In case of PVC conduits, for jointing of the PVC conduit accessories to the conduits PVC sealing solvent of approved make shall be used to avoid any ingress of cement mortar, water, etc.

External installation of GI / PVC conduits

The scope of work covers external installation of GI / PVC electrical conduits with all accessories on the outer surface of RCC roof slab, floor, walls, columns, beams etc.

The conduits shall be neatly installed in line and levels as directed by the EIC.

The conduit shall be clamped at every 1.0 mtr distance by spacer and clamp as directed by the EIC. Nylon plug and 25 mm screw shall be used for fixing the spacers over the wall.

Embedment of GI / PVC conduits in roof slab / columns / beams

The scope of work covers embedment of GI / PVC electrical conduits with all accessories in RCC roof slab, columns, beams etc.

The Contractor shall take adequate precaution to avoid any leakage/flow of cement mortar through the joints between Conduits and Conduit & Conduit accessories. In order to avoid filling of cement mortar, all joints of the conduit system shall be sealed with insulation tape and un-used holes of junction boxes shall be blocked by gunny cloth and followed by insulation tape applied over that.

Care shall be taken to avoid crowding or over laying (more than 2) of conduits to avoid reduction in thickness of concrete / masonry.

JBs and conduits shall be tied to the reinforcement rods with GI wires to avoid dislocation at the time of concreting.

If any of the JB is not butting with the shutter, the gap between the JB & shutter shall be packed properly and the JB shall be tied to the shutter by nails and binding wires.

Light fixtures' position and orientation shall be marked on the shutters as per the drawings for even distribution of lighting.

Paint marking shall be done on the shutter around the conduit drop and JB for easy identification. On removal of the shuttering the contractor shall identify all the conduit junction box openings and provide pull wires.

Pouring clearance shall be obtained from the EIC before concreting.

Embedment of GI / PVC conduits in brick walls / floors

The scope of work covers chipping, embedment of GI / PVC electrical conduits with all accessories in brick masonry walls, floors, cement packing, etc.

The conduits shall be neatly installed in line and levels as directed by the EIC.

Chipping shall be done on the walls / floors to required depth and width such that the conduit / JB are fully inside the plastered surface. The chipped area of wall / floor shall be brought back to the original condition.

JBs and conduits shall be tied to the brick walls with GI wires and nails to avoid dislocation.

The Contractor shall take adequate precaution to avoid any leakage/flow of cement mortar through the joints between Conduit and Conduit & Conduit accessories. In order to avoid filling of cement mortar all joints of the conduit system shall be sealed with insulation tape and un- used holes of junction boxes shall be blocked by gunny bag and followed by insulation tape applied over that.

In false ceiling areas, outlet pipe from switch boxes shall be left open for laying open conduits which will be provided at the time of electrification works of the building.

Position of wall light fixtures shall be as per the drawings for even distribution of lighting.

Plastering clearance shall be obtained from the EIC before plastering.

S, I of flexible metal conduits

The scope of work includes supply and installation of GI flexible metal conduits as per SOQ. The conduits shall be brought to site in a single lot and shall be used as and when required as directed by the Engineer-in-Charge.

Supply & Glanding at both ends of each bit of conduit, installation of 14 SWG copper wire with copper clamps on the outer surface of the conduits are in the scope of contract. 14 SWG copper wire and

copper clamps will be provided by the department at free of cost.

Specification for supply of GI conduits

Standards

The conduits covered by this specification and otherwise stated the design, manufacture and tested in accordance with the latest editions of the following standards.

IS 14763 – 2000: Conduits for electrical purposes - outside diameters of conduits for electri- cal installation and threads for conduits and fittings - specification

IS 14768 (Part 1) - 2000: Conduits fittings for electrical installations - specification IS 14768 (Part 2) - 2000: Conduits fittings for electrical installations - specification

IS 9537 (Part I) – 1980: Specification for conduits for electrical installations

IS 9537 (Part II) – 1981: Specification for conduits for electrical installations

IS 3837 – 1976: Specification for accessories for rigid steel conduits for electrical wiring IS 4736 – 1986: Specification for Hot-Dip Zinc coatings on mild steel tubes

IS 2629 – 1985: Recommended practice for Hot-Dip Galvanizing of iron and steel. IS 13229 – 1991: Zinc for Galvanising – specification

IS 2633 – 1986: Method for testing uniformity of coating on Zinc coated articles.

IS 6745 – 1972: Methods for determination of mass of Zinc coating on. Zinc coated iron and steel articles.

IS 14962 (Part 4) -2001 & ISO 965 -4 – 1998: ISO general purpose metric screw threads – tolerances

Construction

ERW Conduits shall have High Protection against corrosive or polluting substances. Gas/Arc welded conduits are not permitted

The Conduit fittings covered under this specification shall be suitable for use in application with heavy mechanical stresses as per IS 14768 – 2000 (Part 1) General requirements

The inside and the outside surfaces of conduit accessories shall be reasonably smooth and free from burrs, flash and similar defects; in addition, the edges over which the conductors or cables are likely to be drawn shall not damage the cables or conductors.

Both ends of the pipes shall have uniform threads and one end shall be provided with a coupling.

Dimensions

Dimensions of conduits shall be 25mm / 32mm / 40mm. The conduits shall be supplied in straight lengths of 3 to 5 metres.

The conduit pipes shall have a minimum wall thickness of 1.6 mm for 20 mm dia conduits /

1.8 mm for 25 & 32 mm dia conduits and 2 mm for 40 mm dia conduits.

GI Coating Requirements

Galvanizing – The conduit and accessories may, as far as practicable, be galvanised in accordance with IS: 2629 – 1985.

Mass of Zinc Coating

a) The mass of Zinc coating shall be to provide heavy protection outside and medium protection inside as defined in IS 9537 (Part II) – 1981.

b) For conduits covered by the specification, the minimum mass of zinc coating, when determined on a 100 mm long test piece in accordance with IS: 6745 - 1972, shall be 360 g/m^2.

c) The mass of zinc coating shall be not less than 360 g/m^2 as determined from the average result of two specimens taken from opposite ends of tube selected for testing.

d) The mass of coating expressed in grams per square metre shall be calculated by dividing the total mass of zinc (inside plus outside) by the total area (inside plus outside) of the coated surface.

Freedom from Defects

a) The zinc coating shall be reasonably smooth and free from such imperfections as flux, ash and dross inclusions, bare patches, black spots, pimples, lumpiness, runs, rust stains, bulky white deposits and blisters. Guidance for rejection/acceptance of these defects has been prescribed in Appendix A of IS: 2629 – 1985.

b) Small black spots may be repaired as prescribed in Appendix A of IS: 2629 – 1985.

c) Guidance for rejection/acceptance in case white rust shall be as prescribed in Appendix A of IS: 2629 – 1985.

Quality of Zinc

a) Zinc containing at least 98.5 percent by mass should be used for the purpose of galvanizing, or the molten metal in galvanizing bath shall contain not less than 98.5 percent by mass of zinc.

Table 10

Chemical Composition of Zinc for Galvanizing		
S. No.	Constituent	Grade Zn 98.50%
i	Zinc, Min	98.50
ii	Lead, Max	1.25
iii	Cadmium, Max	0.02
iv	Iron, Max	0.02
v	Tin, Max	0.02
vi	Copper, Max	0.02

b) The possible presence of other unnamed elements is not precluded. However, analysis shall regularly be made only for

the elements (except zinc) listed in the table. The zinc content shall be determined by difference between the sum of total elements analysed and 100. By agreement between manufacturer and the purchaser, limits may be established for other elements.

Uniformity of Galvanised Coating

The galvanised coating when determined on a 100 mm long test piece in accordance with IS: 2633 – 1986*, shall withstand 4 one-minute dips.

Adhesion Test

Galvanised tubes up to and including 50 mm nominal bore, when bent cold through 90˚ round grooved former having radius at the bottom of the groove equal to 8 times its outside diameter, shall not develop any crack in the coating.

Pre- Despatch Inspection

The representative of the Purchaser shall have at all reasonable times access to the Supplier's or sub-supplier's works for the purpose of witnessing the tests and to ascertain that the cable being manufactured conforms to the requirements of this specification.

The Purchaser shall be given at least 15 days advance notice prior to the commencement of testing, so that the representative of the Purchaser can plan to witness the tests. All the tests indicated in the test clause of this specification shall be carried out in the presence of the representative of the Purchaser by the manufacturer and shall provide all the facilities and equipment for testing.

Four copies of the Test Certificate shall be furnished to the approval of the Purchaser prior to despatch of conduits from manufacturer's factory.

Tests

All the tests specified below including repeated tests shall be carried out in accordance with the Indian Standards by the manufacturer in the presence of representative of the Purchaser.

If the conduit, fail to pass the tests specified, the representatives of the Purchaser have the option to reject it. The Purchaser, however reserves the right to waive off the inspection

Type Tests

The following shall constitute the type tests:

a. Checking of dimensions,
b. Bending test,
c. Compression test,
d. Impact test,
e. Collapse test,
f. Estimation of Mass of Zinc
g. Uniformity of Galvanised Coating
h. Adhesion Test
i. Free Bore Test

The Purchaser at his opinion may waive all or any of the type tests provided Type Test Certificates carried out on essentiality identical conduits are furnished by the manufacturer and accepted by EIC. Two copies of test reports shall be submitted after approval of preliminary copy is received from the purchaser.

Acceptance Test

Apart from the above tests, the following shall be carried out as acceptance test. These tests shall be carried out from samples of the delivery lot. The following shall constitute the acceptance tests:

a. Checking of dimensions,
b. Bending test,
c. Uniformity of Galvanised Coating
d. Adhesion Test
e. Free Bore Test

Packing and marking

The conduits covered by this specification shall packed suitably such that it can withstand rough handling during transport and ensure that no damage will be caused to the conduits during transit. Conduits shall be duly covered at both ends upto 300 mm length with Hessian cloth to avoid ingress of moisture. The marking shall be done on each length and shall have the following information :

The conduit shall be marked with manufacturer's name, trade-mark or other identifiable symbols, immediately followed by a classification code.

Marking shall be durable and legible.

Rigid conduits shall be marked at least once on each manufacturing length, preferably 50 mm from one end.

Specification for supply of heavy duty GI conduit accessories

Long Bend

Galvanised steel conduit long bend of appropriate size conforming to relevant Indian Standard Specification shall be used wherever conduit drops in RCC beam/column/slab/brick masonry wall. Galvanizing of the bends shall be carried out both inside and outside. The inside surface shall be smooth.

The long bends shall be free from any cracks or holes and shall have adequate thread profile to have effective joint with conduits. Hot dip galvanized steel conduit long bends of appropriate size only to be used for change in direction. Offset formation of conduits and usage of short bends and elbows will not be permitted.

Conduit Junction Boxes.

Galvanised iron way boxes (junction boxes) of required size (25 mm and 32 mm) diameter with 1 way / 2 way/ 3 way/ 4way conforming to relevant Indian Standard Specification only to be used. The junction boxes shall have galvanised steel cover with neoprene gasket and

fixed with brass screws. For embedded conduits the depth of JBs shall be 75 mm and for conduit installed on surface depth of JBs shall be matching with the diameter of conduit.

The junction boxes shall be free from blow holes, cracks and shall have axially formed thread profile of adequate length to provide effective joint with conduits. The interior surface of junction boxes shall be smooth and free from burrs.

For fluorescent light fittings, 25 mm deep dummy junction box shall be provided at one end and 75mm deep junction box at conduit connecting end. These junction boxes shall be provided at 300 mm on either side of the centre.

Check Nuts

Hot dip galvanised conduit check nuts of appropriate size conforming to relevant Indian Standard Specification shall be provided for termination of conduits in pull boxes/ switch boxes at its interior. The check nuts shall have adequate length of thread profile to have effective joint.

Copper Wire

Annealed copper wire of 2 mm dia (14 SWG) of >95 % purity shall be run along the conduits for lighting and power circuits and terminated at junction boxes/MS Boxes/ Dummy Boxes and clamped to conduits closely by means of copper earthing clips at an interval every one metre

Copper Earthing Clip

Copper earthing clip for respective conduit sizes shall have 8 mm width X 0.8 mm thick and provided with clamping brass screw and brass nut. The copper clip shall be >95% purity and it shall be provided every one metre along the conduit run for clamping copper earthing wire of lighting and single phase power circuits.

Steel Wire

Hot dip galvanised steel wire of 1.6 mm (16 SWG) dia and annealed quality shall be used as pull wire. It shall be drawn through conduit between junction boxes, between junction boxes and pull boxes/ switch boxes and protrude at least by 150 mm at both ends.

Approval of samples

One full length of conduit pipe and one sample piece of long bend, conduit junction box, check nut, copper wire, copper earthing clip, galvanised steel wire shall be got approved by engineer-in-charge (electrical) prior to bulk procurement.

Specification for supply of PVC conduits

The PVC Circular Rigid Conduits (Heavy Gauge) shall conform to IS 9537-1988 (Part III) revised and amended upto date, suitable for Electrical Wiring. The wall thickness of the conduits shall be as per the above Standard. The PVC Heavy Duty Couplers required for

jointing the conduits wherever necessary shall be supplied and installed at no extra cost.

Details of Heavy Duty PVC Rigid Conduits conforming to IS : 9537 Part I & III. The thickness of PVC conduits shall be as per the following table.

Table 11

Nominal OD in mm	Wall Thickness	Internal Diameter	Weight in Grams/Metre
20	1.9 - 2.0	15.8	155
25	2.0 - 2.1	20.6	210
32	2.5 - 2.6	26.8	335
40	2.6 - 2.7	34.4	440

A sample length of Conduit shall be submitted to the Engineer-in-Charge for his approval before taking up the purchase in bulk.

Specification for supply of heavy duty PVC conduit accessories

The PVC Conduit Accessories such as Couplers, Bends, Conduit Circular Junction Boxes, Adapters, Reducers, Male/Female Bushes, Lock Rings, Lock Nuts, etc. shall conform to IS : 3419-1976 and BS : 4607 revised and amended up to date suitable for the above PVC Circular Rigid Conduits. The Conduit Fittings shall have high impact resistance and pass the test requirements of IS: 3419, IS: 9537, BS: 4607 and BS: 6099 where applicable and relevant
I.E.E. Regulations. The material shall be unaffected by solutions of inorganic acids, alkalis and salts. The conduit accessories shall have adequate wall thickness and shall be compatible for the conduits supplied.

The lid fixing pillars in the boxes shall be provided with tapped M4 Brass inserts to facilitate the fixing of the cover. The boxes shall have a moulded recess for the earth terminals.

All the conduit junction boxes shall be supplied with PVC Circular Lids and Cheese Headed Brass Screws with ISO Threads and the unit rate quoted shall be inclusive of the cost of the lids and screws. For embedded conduits the depth of JBs shall be 75 mm and for conduit installed on surface depth of JBs shall be matching with the diameter of conduit.

The term accessories includes Bends, Single/Multiway Conduit Junction Boxes, couplers, Adapters, Reducers, Male/Female Bushes, Lock Rings, Lock Nuts, cement for jointing of conduits (adhesive), etc. which are requiredfor the completion of the job.

A sample in each type conduit accessory shall be submitted to the Engineer-in-Charge for his approval before taking up the purchase in bulk.

28 GI pipes

Specification for supply of GI pipes

The heavy duty GI pipe and accessories shall be confirming to IS

1239. Wherever GI bend is required, it shall be provided as directed by the EIC. GI pipe and accessories will be measured in per metre basis.

Embedment of pipes

The pipe shall be embedded with required accessories on floor, slab, etc. The pipe shall be laid in the rubble stone filling below RCC slab as directed by the EIC.

Installation of pipes on surfaces

The pipe shall be installed required accessories over floor / wall / columns / MS supports.

The pipe shall be installed properly and fixed using 25 x 6 mm GI spacer with 25 x 3mm GI clamps at every 750mm.

29 S, I of PVC Trunking (Casing & Capping)

The scope covers supply and installation of casing and capping. Casing and capping shall be of good quality PVC, free from defects like deformations, unevenness, blisters, cavities, etc

The casing shall be of square or rectangular body with top of the side walls suitable for tightly fitting slide-in type capping with double grooving. All surfaces shall have smooth finish inside and outside.

All the components of the trunking such as bends, junctions, end caps required for completion of the work is included in the scope this item. Contractor shall visit the site and arrive at the components required for the work.

Before installation, the line of fixing the trunking shall be marked with thread in lines and levels as directed by the EIC, holes shall be drilled at every 1m along the marked line and PVC fishers shall be provided in the holes for fixing the Casing with screws.

Cap shall be provided over the casing after laying wires through the casing. However, wiring is not part of this item.

30 Removal of vegetation bush

Small plants, grass, bushes and other debris shall be uprooted and removed from various locations in IGCAR.

It shall be noted that the work is preferred to be executed manually and not by using machineries, unless & otherwise permission is granted by the EIC.

Due precaution shall be taken by the Contractor not to affect the existing services lines during the earth excavation for uprooting plants.

Removed vegetation shall be disposed off at suitable locations or burned as directed by the Engineer-in-Charge.

Corrigendum –I

Please re-read the following clauses in Section VI as given below:

Installation of cables direct in ground

'river sand' mentioned in the sub clauses of clause 3.2 shall be read as 'river sand / m- sand(Plastering grade)'.

Installation of cables in built-in trench

3.3.6 **LT/ Control / Telephone cables / HT cables upto 185 sqmm**: The cables shall be properly dressed and clamped by 25x3 mm GI clamps and 25x6mm GI spacers at 600mm interval in the vertical run and 750 mm interval in the horizontal run based on the sizes of cable as directed by Engineer-in-charge. Clamps and spacers shall be made of mild steel (MS) and hot dip galvanized after fabrication. All the fasteners shall be of GI. Alternatively Stainless steel cable tie as approved by Engineer-in-charge is also acceptable.

Technical specification for LV cables

The following cable codes are appended

code	Conductor	Insulation	Innersheath	Armour	Outersheath
-2XYWS	Copper	XLPE	PVC Type ST2	Wire	PVC Type ST2 with FRLS
-2XYFS	Copper	XLPE	PVC Type ST2	Flat	PVC Type ST2 with FRLS

9 Supply, fabrication and installation of cable entry arrangement

9.1.2 Table 2

Size of cable entry plate	Drawing No.
1200 x 1200 mm	IGC/ESD/4011/2001/1-R1

9.1.11 Two numbers of 50x6mm copper flats each of having length 0.5m shall be provided in cable entry arrangement by the contractor as directed by the EIC before pouring concrete. Copper used for this purpose will not be measured separately.

12 Earthing

Installation & testing of earth electrode

12.2.1 For copper/SS rod earth electrode, soil treatment with Ground enhancement material and red sand refilling, measurement of earth resistance value etc.

S,I,T of Copper/SS rod earth electrode

The scope of this item includes supply, installation and testing of 12mm dia. Copper soild rod/

16mm Stainless steel solid Rod earth electrode as given in the schedule.

The copper earth electrode shall be fabricated out of 12 mm dia, 3000

mm long copper rod of minimum purity of 95 %. Terminal strip of 250 x 37 x 6 mm of copper flat shall be brazed to the electrode at top portion and two pieces of 200 x 25 x 3 mm of copper flat shall be brazed at bottom portion as per Drawing No. IGC/ESD/5060/1003/1. The SS rod earth electrode shall be fabricated out of 16mm dia, 3000 mm long SS rod of grade 304 with one end pointed and other arrangements as per drawing No.IGC/ESD/5060/1009/1.

12.6 End termination of stranded copper conductors / unsheathed insulated flexible copper cables

Punched aluminium tag indicating the from and to location of the conductor shall be tied on the terminated end.

13 Poles

Specification for PU coated GI street light/Flood light poles

Please refer the respective drawing as per the list given below for a particular type of pole specified in SOQ.

a) Single arm street light pole 9m -Drawing No.IGC/ESD/4013/5005/1-R1
b) Double arm street light pole 9m - Drawing No.IGC/ESD/4013/5005/3-R1
c) Street light pole 11m - Drawing No.IGC/ESD/4013/5003/1-R1
d) Flood light pole 11m - Drawing No.IGC/ESD/4013/5004/1-R1.

Specification for PU coated / Hammer tone finish GI Post Top Lantern (PTL)

Please refer the respective drawing as per the list given below for a particular type of PTL specified in SOQ

a) PTL embedded foundation type 2.75m - Drawing No. IGC/ESD/4013/1001-R1
b) PTL pedestal type 3.75m & 4.75m - Drawing No. IGC/ESD/2021/6001/P2-R1

Installation of pedestal type PTL

Cast Aluminium JB 'mentioned in the clauses of 13.4.3, 13.4.4 & 13.4.8 shall be read as 'GFRP box'.

Installation of embedded foundation type PTL / PTL with single arm / Bollards

Scope of work involves fabrication, supply and embedment of cylindrical junction box, providing foundation, GI conduits, 8 SWG copper earthing conductors, providing terminal block, laying of termination of flexible cable, etc. as per the drawing IGC/ESD/4013/1001-R1 and as directed by the EIC.

13.5.5 Scope of work involves fabrication, supply and embedment of cylindrical junction box, providing foundation, GI conduits, 8 SWG copper earthing conductors, providing terminal block, laying of termination of flexible cable, etc. as per the drawing IGC/ESD/4013/1001-R1 and as directed by the EIC.

S, I of GFRP JB with hinged cover for Street light poles

13.6.2 A sample box shall be submitted for approval by EIC before proceeding with bulk procurement of boxes.

Internal arrangement for the JB shall be as per drawing No: IGC/ESD/2021/6001/3.

The overall dimension of the JB shall not be less than 250 (L) X 300 (H) X 115 (D) mm and the wall thickness shall be 4mm nominal and minimum IK 8 classification for impact.

The junction box shall have the following components and features.

i) 1No. terminal block having 8way, 63Amps, stainless steel stud terminals
iii) 2 Nos. 6 mm Bolt, 2 Nuts & 4 Washers (Stainless steel/Brass).

v) Strong, moulded Ultra guard fiberglass reinforced polyester material construction with matching raised cover.
vi) 300 series stainless steel snap latches feature padlock hasp.
vii) Two 300 series stainless steel hinges.
viii) Closed-cell neoprene gasket encased in a continuous channel.
ix) 300 series stainless steel wall mounting feet with 3/8-16 stainless steel screws included.
x) 3/8-16 threaded inserts for optional back panel.
xi) UV stabilized for outdoor use. The FRP cover shall be provided with 2 numbers of stainless steel hinges and stainless steel fastener.

Alternatively Cast aluminium junction Box (as approved by EIC) also can be used in place of GFRP box.

16 Light fixtures, occupational sensors and contactors for control

S, I, T, C of Light Fixtures

Heading shall be read as <u>Mounting requirements for indoor 4 feet LED / fluorescent light fixtures</u>

In case SOQ refers to installation with ball and sockets, the light fitting shall be installed on ceiling with 2 Nos. ball & sockets. For ceiling mounted light fixtures suitable length of 19mm / 20mm down rods as per site requirement.

The down rods shall be painted with one coat of red oxide and two coats of synthetic enamel paint as directed by Engineer in charge.

Ball and sockets, consumables such as nylon sleeves, brass screws, terminal blocks and copper lugs are included in this scope. However down rod will be measured separately.

In case SOQ does not refer to installation with ball and sockets, the luminaires shall be installed on teakwood / PVC round blocks. 2 Nos. of teakwood / PVC round blocks and 1 No. 6A, 230 V, 3 plate jumbo ceiling rose & 3 Core x 1.0 Sq.mm flexible copper cable required for wiring etc. shall be supplied by the contractor. Before mounting the teakwood round blocks its exteriors and interiors shall be given 2coats of wood primer and 1coat of synthetic enamel paint of colour matching with the ceiling. For LEDs of smaller wattage direct fixing on the wall

may be adopted based on the site condition and approval by the Engineer-in-Charge.

In case of 4 feet LED light fixtures, either the body of the light fixture shall be provided with holes or additional clamps may be provided over the light fixtures for fixing the down rods.

Heading shall be read as <u>Mounting requirements for less than 2 feet light fixtures on ceiling or wall</u>

Heading shall be read as <u>"Mounting requirements 4 feet light fixtures on wall"</u>

16.1.8.5 In case SOQ refers to ball socket arrangement, the light fixture shall be installed on wall with 2 Nos. Ball & Sockets and suitable length of approx 100 mm, 19mm / 20mm Nipple. Consumables like nylon sleeves, brass screws, terminal blocks and copper lugs are also included in this scope.

Heading shall be read as <u>"Mounting requirements for recess type light fixtures or for suspended light fixtures"</u>

Deleted

S, I, T, C of wall mountable type heavy duty exhaust fans

Specification for wall mountable type heavy duty exhaust fans

The scope of work includes supply, installation, testing and commissioning of single phase, turbo heavy duty industrial type exhaust fan confirming to IS 2312 along with Aluminium grill bracket as per the drawing no: GSO/EMS/KTS/E-F-02,3C x 1.5 Sq. mm PVC insulated & FRLS sheathed copper flexible cables of required length and 6A, 3 pin plug top with indicator.

17.2.1.4 The blades shall be non-corrosive type and dynamically balanced for vibration free rotation. The body shall be made of die-cast Aluminium to ensure long life. The exhaust fan shall be ISI certified.

18 Point Wiring for Light/Power/Fans / Timers /Sensors/Telephone/LAN including supply of wire

18.1.12 For Telephone points, tinned copper flexible cable having twin twisted cores with PVC sheath shall be provided and the conductor dia shall be 0.71 mm minimum. Each telephone point shall have 1 run of 2 pair or single pair as mentioned in SOQ, twin twisted tinned copper cable from Telephone DB to telephone points.

18.1.20 Deleted

Wiring for Exhaust fan point up to 3Mtr height with 2 Runs of 1.5 Sq.mm (22/0.3) Copper wires for Phase & Neutral and 1 Run of 2.5 Sq.mm (36/0.3) Copper wire for Earth from MCB Distribution Board to Power point through Control Switch Box including supply of weekly timer for Exhaust fan control on 4 Module box, modular bell push, 6A Switch, 4modular plate, 2Modular plate, 2pin 6A socket and 6/16A socket etc as follows:

Cyclic timers are required to control exhaust fans which are installed at an average height of 3 metres inside buildings. The scope of work

includes the following:

Supply, installation, testing and commissioning of programmable cyclic timer for exhaust fan control. The timer shall be installed on surface by method approved by the EIC

Supply & installation of all the components required for the completion of the job which include the following:

a. Module 10A x Bell Push, Thames Sap Code: ACTSBXW100

b. Metal Mounting box - 4M Module Sap Code: ACTXMIIX04

c. Socket 1 Module 6 A, 2 pin Shuttered Thames Sap Code: ACTKSXW062

d. Switch 1 Module 6Ax One-way Thames Sap Code: ACTSXXW061

e. Front plate 4 Module Saphire Sap Code: ACTPAOWV04

f. 6A, 5 Pin shuttered type modular socket

g. Crabtree or equivalent 5A 2 pin plug top suitable for 2 Pin socket above

h. 1.5 sq mm pin type terminal ends

i. 1100V Unsheathed Flexible Copper Conductor FRPVC cable size 1 Core x 1.50 Sq. mm etc.

Installation of 4 module box as directed by the EIC near the exhaust fan.

Required wiring for bell push control from bell push to the 4 module box which is installed near the exhaust fan. 1 pair of wire as above shall be run from the bell push to the 4 module box and terminate at both ends. Distance between the bell push position and the 4M box refer as per drawing.

Connecting 2 Pin plug top on the control wire of timer

Connecting 3 Pin plug top for Timer which will be issued free of cost by the department. However the connecting cable (Part of timer) and terminal ends are to be supplied under this item.

Specification for cyclic timer:

Input power supply: 230 V, 50 Hz to be extended through 3C x 2.5 sq mm flexible sheathed cable of approx 300 mm length.

Output : 6A 3 pin Socket 2 M 6 A 3 pin Shuttered Thames Sap Code:ACTKSXW063 Program : Weekly with provision for flexible ON/OFF time during 24 Hrs

Manual operation : Shall be possible to switch ON for a set time (Say 30 minutes) during OFF condition without affecting the cyclic timings using the bell push

Display : LED clock display in HH:MM format

Enclosure : MS powder coated.
Thickness 1.6 mm or better Preferred
make : Presevi or
equivalent

Pre-Despatch Inspection

The representative of the purchaser shall have at all reasonable times access to the supplier's or sub supplier's works for the purpose of witnessing the tests and to ascertain that the conduit being manufactured conforms to the requirement of this specification.

Conduit Junction Boxes.

Galvanised iron way boxes (junction boxes) of required size (25 mm and 32 mm) diameter with 1 way / 2 way/ 3 way/ 4way conforming to relevant Indian Standard Specification only to be used. The junction boxes shall have galvanised steel cover. For embedded conduits the depth of JBs shall be 75 mm and for conduit installed on surface depth of JBs shall be matching with the diameter of conduit.

SECTION VI (MAINTENANCE)

GENERAL SPECIFICATION AND REQUIREMENTS FOR ELECTRICAL MAINTENANCE WORKS

Contents

Abbreviations

ASTM	American Society for Testing and Materials standards
C	Commissioning
CBIP	Central Board of Irrigation and Power
CFL	Compact Fluorescent Lamp
DB	Distribution Box
DMC	Dough Moulding Compound
EIC	Engineer in charge
ELCB	Earth Leakage Circuit Breaker
EP	Embedded Plate
ERW	Electric Resistance Welding
ETP	Electrolytic Tough Pitch
FRLS	Fire Retardant Low Smoke
FRP	Fibre Reinforced Plastic
GI	Galvanized Iron
HDPE	High Density Poly Ethylene
HF	High Frequency
HP	Horse Power
HRPVC	Heat Retardant Poly Vinyl Chloride
HT	High tension (voltages above 1100V)
I	Installation
IE Rules	Indian Electricity Rules 1956 and its latest amendments
IEC	International Electro-technical Commission
IEE	Institution of Electrical Engineers
IP	Ingress Protection
IR	Insulation Resistance
IS	Indian Standards
ISO	International Organization for Standardization
JB	Junction Box
LAN	Local Area Network
LDR	Light Dependant Resistor
LED	Light Emitting Diode
LT	Low tension (voltages up to 1100V)
MCB	Miniature Circuit Breaker
MCCB	Moulded Case Circuit Breaker
MS	Mild steel
NB	Nominal Bore
Nos.	Numbers
OD	Outer Diameter
OEM	Original Equipment Manufacturer
PCC	Plain Cement Concrete
PIJF	Polythene Insulated Jelly Filled
PIR	Passive Infrared
PTL	Post Top Lantern
PU	Poly Urethane
RCC	Reinforced Cement Concrete
RCCB	Residual Current Circuit Breaker
RPM	Revolutions Per Minute
S	Supply
SITC	Supply, Installation, Testing & Commissioning
SDFU	Switch Disconnector Fuse Unit
SFU	Switch Fuse Unit
SLD	Single Line Diagram
SMC	Sheet Moulding Compound
SOQ	Schedule of Quantities
SS	Stainless Steel
T	Testing
THD	Total Harmonic Distortion
UG	Underground
VTPN DB	Vertical Three Phase Neutral Distribution Box
XLPE	Cross Linked Polyethylene

1 Terms and Conditions

1.1 General terms and conditions to be followed for all works

a. The Contractor shall employ a Supervisor for supervising their work force and Electricians/ Wireman for carrying out work with sufficient mode of conveyance. Supervisor and electrician/ wireman shall have B-license.

b. The contractor shall take Insurance Policy for the individuals employed for the work covered under this contract. License of workmen and Insurance Policy shall be produced to the Engineer-in-Charge, before signing the contract agreement.

c. In case of default on the part of the contractor in carrying out such orders, the Engineer- in-Charge is entitled to terminate the contract.

d. The Contractor shall submit the list of tools and testing equipment proposed to be used for the work. The same shall be available at site during the entire period of contract.

e. All materials brought to site by the contractor shall have delivery challan duly signed by the contractor, authorized representative and submit the challan to the department for the verification.

f. The Contractor is advised to study the systems and nature of work involved before quoting the tender.

g. Power supply required for the work covered, under the scope of this contract will be provided by the department free of cost.

h. List of Engineer, Supervisor with their Supervisor"s Competency License details, Technicians with details of their relevant experience to be employed for this work shall be furnished.

i. All safety precautions are to be taken while at work. Experienced Wireman holding Wireman/ Electrician License shall only be employed as required.

j. Necessary isolation shall be obtained following the prevailing departmental rules before working on live lines. While working with live electrical systems electrical safety is of paramount importance and all the rules as laid down in this document shall be followed scrupulously. No work to be done any live system and necessary isolation shall be done in consultation with Engineer-in-Charge before opening any live enclosure

k. Site Engineer of the contractor shall meet the Engineer-in-charge on all working days and finalize the work to be executed on each day with the approval of the Engineer-in-Charge. He should be present at the work spot during the working hours.

l. Details of cable laid on each day shall be submitted to the Engineer-in-charge in the approved format positively the next working day.

m. The contractor shall follow strictly all the rules / procedures /Codes of the Department in practice and follow the security rules of the Department regarding issue of identity cards, tokens etc., as may be framed time to time by the Department.

n. Street light ladder, Testing instruments like BDV test kit etc will be issued by Dept free of cost depending on availability.

o. The Contractor shall employ Security Personnel at his own cost to protect the Equipment and all materials / installations until the entire work is completed and handed over to the Department.

p. In case, if any one of the departmental equipment or instrument involved in the work suffers from damage or loss of components the same will be procured by the Contractor and made good,

failing which the Engineer – in –Charge will carry out the repair / replacement and recovery will be affected towards the cost of repair/ replacement from the Contractor‟s Running account bill.

q. Wherever height work is involved, It is the responsibility of the contractor to use adequate safety gadgets, ladders / scaffolding while carrying out the works. Also, height work permit shall be obtained from safety division of IGCAR.

r. <u>One sample of every item shall be got approved by the Engineer-in-Charge before bulk purchase.</u>

1.2 Conditions specific to maintenance works

a. For maintenance works minimum TWO groups (Each group shall be consisting of one electrician and one helper) shall be made available for different work covered under this contract and also provide additional groups as required for emergency works.

b. The Lighting or power installations mentioned in the schedule are located in different Labs/ buildings at IGCAR, the contractor has to inspect and assess the quantum of work involved before quoting for maintenance tenders.

c. The quantities shown in the tender schedule are tentative and there may be wide variation at the time of execution especially in maintenance contracts.

d. For maintenance contracts part payment will be released once in FOUR MONTHS only, through Running Account (Part) Bill.

e. For maintenance contracts, the contract is generally valid for a **period of 12 months** from the date of work order. At the discretion of the department, the contract may be considered for RENEWAL for further period of **ONE YEAR** on the same terms & condition of this contract.

f. The contractor shall be fully prepared to work on holidays and mobilize man power and commence the work with in short notice in case of any emergency break down work.

g. The contractor or his supervisor shall be based within 10 Km radius to the Kalpakkam site, in order to mobilize the manpower quickly and commence the work.

h. <u>In case of any Emergency break down after office hours and holidays, the contactor shall be able to contact over phone or in person and he has to mobilise man power and material to attend the break down at the earliest (within Two hours). Hence the contractor is advised to mention his residential address and contact phone No.</u>

i. <u>PVC insulation tapes will be provided by the department free of cost unless otherwise stated in the schedule.</u>

j. The contractor is required to bring three sets of general tool kit necessary for maintenance work and the same shall be kept in IGCAR for a period of One year.

k. The faulty accessories removed from the fittings shall be disposed off /stored as instructed by the Engineer-in-Charge.

l. After attending the fault before putting into service insulation resistance test shall be conducted on the equipment wherever required as directed by the EIC.

1.3 Conditions specific to Motor maintenance works

a. The Contractor shall submit the list of tools and testing equipment being used for the servicing of motors. The same shall be available at site during the entire period of contract. Contractor shall have 1000/500 Volt megger, 200 Amp clamp meter, digital multimeter, tachometer etc.

b. Overhauling program of motors covered under this tender shall be prepared by the contractor and got approved by the Engineer in charge.

c. The scope of work of the contract in overhauling of LT motors as listed under this section is only for guidance. The scope of this item includes carrying out all other works required for the overhauling of motors as per relevant IS, applicable to Motors.

d. For Mono-block pump sets, departmental staff will take care of pump side work if problem exist on pump side.

e. The motors mentioned in the schedule are located in different Labs/buildings at IGCAR. The contractor has to inspect and assess the quantum of work involved before quoting.

f. For all work items under this section, wherever the work is to be carried out after removal of the equipment, the scope of work includes removal, carrying out the work as per specifications, testing, obtaining approval from Engineer-in-Charge, reinstallation & commissioning at original location or as specified by the Engineer-in-Charge. Wherever the equipment is to be taken out of the campus necessary returnable gate pass will be arranged by the Engineer-in-Charge. All the transportation shall be arranged by the contractor including bringing back after work completion.

2 Maintenance/Repair of Earth pits

a. The scope covers maintenance / repair of Earth pits located at various locations in IGCAR campus. Activities involved under this item are listed below:

b. The contractor should follow all the safety procedures such as disconnection of earth leads after obtaining line clear from Engineer-in-Charge.

c. Physical inspection on Earth pits is to be carried out and in case of any abnormality it is to be intimated to the Engineer-in-charge.

d. Remove Earth pit outgoing leads and clean with Toluvene (liquid) or equivalent and reconnect after maintenance.

e. Checking of bolts, nuts and washers for tightness. Damaged bolts, nuts and washers if any shall be supplied and replaced with SS bolts and nuts of same size as the damaged one.

f. After completion of work earth resistance of the earth pit shall be measured by Earth Resistance Megger and the values shall be furnished in the approved format. Measurement shall be done in the presence of Department employee. Details of Earth pit (such as Earth pit Name or Number, Resistance value and Date of measurement) shall be painted as directed by the Engineer-in-Charge. Numbering shall be painted inside the chamber and top of side wall with black letters on yellow background. In case of earth pits with top cast iron cover, the cast iron cover shall be painted with black epoxy paint.

g. The scope of this work also involves the removal of vegetation growth inside and around the earth pit (750 mm), Pouring water, treatment of earth pits by mixing up of Bentonite powder etc.

h. Wherever schedule refers to repair of earth pits, damaged earth pit chambers shall be repaired and brought back to original. In case of major damage as assessed by the Engineer-in-Charge the chamber shall be replaced by new chamber as per drawing No. IGC/ESD//5060/1001/1, 1001/1, 1007/1 after providing a fresh layer of 1:4:8 PCC mud mat of thickness 150mm.

i. All the materials required for completion of above work shall be arranged by the contractor.

3 Painting of Electrical Equipment

a. This item covers painting of electrical equipment which includes switchboards, feeder pillars, transformers bus bars, bus ducts, chequered plates, fans etc as specified in the Schedule of quantities. General specification for painting under this item is as follows:

b. The Contactor shall follow all the safety procedures such as obtaining Line clear, display of Men on line board, discharging the switched off lines etc., before starting the Painting on electrical equipment except various types of fans.

c. Before painting, dust, dirt and oil from the outer surface of the equipment to be painted shall be removed thoroughly. Wherever required as directed by the Engineer-in-Charge the surface shall be cleaned with the help of emery paper/emery cloth and followed by thorough cleaning with thinner.

d. After cleaning of rusted areas with emery paper, the cleaned surface shall be painted with red oxide primer before painting with synthetic enamel paint.

e. Wherever meters, relays, selector switches etc. are provided, it must be properly protected by paper or grease as directed by Engineer-in-Charge.

f. Engraved parts like name plate of Panels/feeders or caution boards etc shall be properly greased before painting and it must be thoroughly cleaned after completion of painting.

g. Stencilled letters shall be noted down before painting and it must be stencilled after completion of painting work.

h. Un-wanted paint from the surface where it is not required must be thoroughly removed. Spillage of paint on the ground shall be avoided and if it falls on the ground, it shall be fully removed.

i. Wherever permitted/instructed by the Engineer-in-Charge spray painting shall be followed.

j. Colour scheme to be followed will be same as the original colour of the equipment unless otherwise specified by the schedule or by the Engineer-in-Charge.

k. Type of paint, primer, and number of coats shall be as mentioned in the schedule.

l. Sufficient settling time shall be given between coats as directed by Engineer-in-Charge or as per manufacturer‟s recommendations.

m. Painting of various types of fans or air circulators shall be carried out in the specific area allotted for the work. The fans shall be brought to the allotted location, painting completed and restored to the original position or to stores as directed by the Engineer-in-Charge.

n. Wherever instructed by the Engineer-in-Charge spray painting shall be employed.

o. The paint thickness shall be minimum 80 micron after final coat

4 Identification and rectification of faults with or without replacement of accessories

a. This item covers identification and rectification of faults in various components of lighting and power circuits or street light system. The job to be carried out may involve replacement of accessories also as mentioned in the schedule. In case the schedule refers any accessory as supply item, it shall be supplied by the Contractor and all other items required for completion of the job will be provided by the Department. The sundries such as fasteners, bunching tape required for completion of the work shall be supplied and installed by the contractor.

b. In general the nature of faults include loose connection, terminal burnt, pin contact loose, fault on lamps, ballasts, starters, ignitors holders, MCBs, switches, street light system components etc. Please refer the SOQ for nature of fault and type of the system.

c. For indoor systems the accessories include 5A to 16A switches, telephone jacks, TV coaxial socket, 20A Modular motor starters, modular plates of different sizes, plug tops in Flush/Concealed type MS switch boxes, MCB etc. the scope of this item includes identifying the fault and replacing the faulty components in lighting or power circuits. Jumper wires, lugs and

screws shall be supplied and replaced wherever required. The switch/socket/MCB/RCCB/ RCBO etc will be issued free of cost unless otherwise stated in the schedule. Supply of crimping lugs, bunching tape and other required materials are in the scope of this item. Repair shall be carried out in such a way that the system shall be brought back to its original condition.

d. The faulty components shall be handed over to stores or as directed by Engineer in charge

5Supply and Installation of Electrical Accessories

a. Accessories specified in the SOQ shall be supplied and installed. Switches and sockets shall be generally of modular type (Crabtree/Siemens) unless otherwise specified. Removed items shall be disposed off or returned to stores as directed by Engineer-in-Charge. All the items required for the completion of work shall be supplied under this item.

6 Installation of Electrical Items

a. The item to be installed will be issued by the department free of cost. All the other required items like fasteners shall be supplied by the contractor. Installation shall be carried out as directed by the Engineer-in-Charge.

7 Trimming / jungle clearance

a. All the machineries, tools, tackles required shall be arranged by the contractor. Adequate safety measures shall be taken while carrying out the work.

7.1 Trimming of branches

a. The scope covers trimming of braches near the street light luminarie including disposal of removed branches to a location within the lead of 3kM. All the machineries, tools, tackles required shall be arranged by the contractor.

7.2 Grass removal

a. The scope covers removal of grass at the locations specified by the Engineer incharge and creeper clearing around street light poles and PTLs for 1 m X 1 m area.

7.3 Jungle clearance

a. The scope covers removal of bulb weeds, grass including cutting all unwanted plants, branches, twigs, wild growth etc. and disposing the same within 100 meters away manually or burning them without disturbing the area. Prior permission shall be obtained from the EIC before burning the wastes.

7.4 Heavy jungle clearance

a. The scope covers cutting all unwanted plants, branches, twigs, wild growth, tress and saplings of girth upto 30cm, uprooting of rank vegetation etc, complete and disposing the same 100m away by manually or burning them without disturbing other areas etc. The useful firewood shall be cut and stacked at a place approximately 100m lead as directed by EIC. Prior permission shall be obtained from the EIC before burning the wastes.

8 Maintenance of Storage batteries

a. Storage batteries under this item are mainly used for solar/emergency street lights installed at various locations. These batteries are of flooded Lead Acid type and need periodical maintenance as per manufacturer"s recommendation. The maintenance activities include the following:

b. Inspection of each cell for specific gravity & level of electrolyte and general cleanliness.

c. Wherever the level is lower than recommended, the cells shall be topped up with distilled water. Required distilled water will be provided free of cost by the department.

d. Battery terminals and surface shall be cleaned of all dust and dirt and chemical depositions. Cleaning materials required shall be provided by the contractor.

e. The terminals shall be tightened after cleaning as directed by the EIC and petroleum jelly shall be applied.

f. In the unlikely event of very low voltage or specific gravity the battery shall be removed, transported to CSS for repair, taken back to the original location after repair and re-commissioned. No separate measurement will be done for this activity.

9 Maintenance of Street light control unit

a. Street and area lighting system is controlled by dawn to dusk controller with the help of LDR or cyclic timer. Scope of the work includes the following:

b. Inspection of components in the unit for any failure or deterioration

c. General cleaning of the interior and exterior of the unit. All the materials required for cleaning shall be arranged by the contractor.

d. Replacement of components as directed by the Engineer-in-Charge. Components required for replacement will be issued free of cost by the department except for crimping lugs and fasteners. Crimping lugs & fasteners if required shall be provided by the contractor.

e. Tightening of all electrical connections in the unit.

f. Paint touch up if required shall be carried out and all the required material shall be provided by the contractor for completion of the work.

10 Painting of following items / cement washing, numbering of RCC

poles 10.1 Painting and numbering of RCC pole

a. Under this item already erected RCC poles shall be painted and numbered. It includes the following steps:

b. The surface of the street light pole shall be cleaned with water and the surface shall be made free of dirt or any foreign material.

c. The minor crack and damage shall be corrected before painting.

d. After the surface is dried up two coats of cement washing to be done with adequate quantity of cement and white cement mixture. The covering of cement wash shall uniform throughout the pole as per the instruction of the Engineer-in-charge.

e. Numbering of pole shall be done as per ***clause 10.3 of this document***

10.2 Painting with one coat of primer and two coats of HR Aluminium paint

a. Scope of work includes Aluminium painting of metallic surfaces of equipment as described in the Schedule. All the items required to complete the work shall be supplied by the contractor. It includes supply of HR Aluminium paint, suitable primer, cleaning brush etc.

b. Before carrying out the work, the surface to be painted shall be cleaned thoroughly by using emery sheet as directed by the EIC. Painting process shall include sufficient curing time as recommended by the manufacturer. The thickness of final coat of paint shall be 80 microns.

10.3 Numbering of electrical equipment

a. Numbering shall be done with synthetic enamel paint of two different colours, one for back ground and other for letters. The scope of the work is numbering of electrical equipments with enamel paint. Area to be used for numbering shall be cleaned off all dirt. Two coats of background painting to be done. Size and shape of back ground shall be as per schedule. Letter size and colour shall be as directed by the EIC. Item will be measured in numbers.

b. Supply of all items required for completion of work like paint, brushes, stencils are in the scope of this item.

11 Rewinding of different types of motors

11.1 Rewinding of fan motors

a. The scope of the work includes the following.

b. The fan shall be removed from the location and transported to the work spot identified by the Engineer-in-Charge.

c. All the components required for completion of the job is in the scope of this item.

d. Dismantle the fan and remove the burnt out windings from the stator

e. Clean the fan stator free from metal particles

f. Insulate the slot with 7/10 mil. thick millinex insulating paper

g. Wind the stator coil to the required number of turns with polyester based super-enamelled copper conductor for both the starting/running windings with suitable gauge superior quality winding wires confirming to ***Clause 11.3 .***

h. Assemble the coil in the stator, uniformly insulated with cotton tape, plugging the gap between the slot and the coil with fibber wedges wherever necessary.

i. Termination of end connections, insulation of the coil with superior quality air drying varnish (Temperature Index: 130 degree C), baking etc. Air drying varnish used shall be conforming to ***Clause No. 11.4*** .

j. Dry out the fan stator in the oven

k. Re-assemble the fans with all their components

l. Testing & recording the winding resistance and insulation resistance values. Note: IR value shall be minimum 50 Mega Ohms at normal room temperature. The fan shall be allowed to run continuously with fan blades in position for 8 Hrs. Care shall be taken by the contractor to ensure the winding temperature is not exceeding 45 degree centigrade above ambient, and the speed shall not be less than the prescribed speed as given in the name plate.

m. After satisfactory operation, fans shall be transported to the site and installed in position as directed by Engineer-in-Charge.

n. Required quantity of ball bearings will be supplied by the department free of cost wherever the schedule says so, else will be measured separately as per the schedule item. Wherever required the supply of bush bearing is in the scope of the contractor. The removed copper need not be returned to department.

11.2 Rewinding of LT motors

a. The procedure to be followed by the contractor for this work is detailed below.

b. All the components required for completion of the job is in the scope of this item.

c. Dismantle the motor from the driven equipment and transport the same to the work spot identified by the Engineer-in-Charge.

d. Dismantle the motor and remove the rotor from the yoke and offer the same for inspection.

e. If the coils are found burnt, the entire windings shall be removed from the assembly. Use of heat to remove the old winding is strictly prohibited.

f. Relevant winding diagram shall be prepared and submitted for approval.

g. Provide insulation material to the required level (as in the original winding) in the stator slots and wind it with polyester based super enamelled winding copper wire of correct size conforming to the detailed specification as per ***Clause 11.3. The winding shall be made in the stator strictly as per the approved winding diagram. The slot shall be plugged by Synthetic fibre wedges only and paper wedges are not permitted. The window height of the coil shall be maintained uniform throughout.***

h. End termination, insulating with superior quality air drying varnish, baking etc. are in the scope of this item. Air drying varnish used shall be conforming to ***Clause No. 11.4 and temperature index of varnish shall be in line with the class of insulation of the original winding. The overlapping portion of winding coil on both sides shall be applied with superior quality epoxy gel coat over the varnish. (Mahindra & Mahindra make or equivalent).***

i. Bearing shall be inspected for its healthiness and th same may be re-installed in the motor assembly. In case condition needs replacement, this shall be changed. Required quantity of ball bearings only will be supplied by the department free of cost wherever the schedule says so, else will be measured separately as per the relevant schedule item. Necessary bearing grease of suitable grade shall be supplied and applied to the bearings prior to assembly.

j. After the completion of rewinding of motor, the motor shall be put to test and its performance is checked. The following parameters shall be recorded during testing and the values shall confirm to original condition.

k. Initial IR values and the winding resistance of the coils / complete winding shall be recorded after the rewinding, prior to baking / varnishing / gel coating. The Contractor shall measure all parameters such as IR values, coil resistance, no load current, condition of ball bearings, noise level of motor (while running) after rewinding of motor. The final values shall be noted after the complete assembly of the motor in the presence of Engineer-in-Charge or his authorised representative.

l. Supply of required quantity of copper wire, varnish, insulating materials etc, end termination materials such as insulators and copper terminal lugs, fibre glass wire from winding to terminal block etc are in the scope of the contractor.

m. The material shall be purchased only from authorised stockiest / distributors nominated by the manufacture. The scrap copper wire removed from the motor need not be returned to the department.

n. The motor shall be neatly painted with two coats of red oxide primer and two coats of synthetic enamel gray / blue paint over the primer. (Minor repair work such as welding etc. shall be carried out under this item to put the Motor back to service)

o. Test Checks: After successful re-winding, the contractor shall transport the motor to its original location for installation and test it at load condition for the following tests. 1) Speed, 2) No load/ load current, 3) Noise level, 4) Vibration after allowing the motor to test run for 8 Hrs.

p. If any special maintenance work other than normally followed needed for the motor such as dynamic balancing of rotor, bracing of broken rotor bars and other parts shall be carried out in consultation with the Engineer-in-Charge and the cost incurred for the above special maintenance will be reimbursed to the contractor on production of actual cash receipt accompanied by the test certificate.

11.3 Specification for Polyester Enamelled Round Copper Wire, Class 130

a. The wire shall be conforming to is 13730 - part 13 and shall have a sole coating based on Polyester resin, which may be modified providing it the chemical identity of the original resin and meets Grade 2 Class 130 requirements i.e. minimum temperature index of 130 and a heat shock temperature of at least 155°C.

b. The wires shall be made from electrolytic grade copper of 99.9% purity. The wire shall be of uniform cross section throughout its length.

c. The wire should not fail within 2 minutes when tested for a cut through temperature of 240°C.

d. The wires shall be resistive to abrasion, solvents, transformer oil and refrigerants.

e. Preferred Make: HTP/HWP/Atlas/Jalan/Ceramic

11.4 Specification for Air Drying Varnishes

11.4.1 General

a. The insulating varnish shall have the property of quick drying. A thin film of varnish shall not become tacky in less than 4 hours.

b. The flash point of the insulating varnish is required to be minimum of 23°C.

c. The varnish shall have excellent dilution ability i.e. minimum of 100%.

d. The varnish should not react with copper and the colour of copper should not change.

e. No cracking of varnish film shall be detectable by normal vision.

f. The varnish shall have an electric strength minimum of 35 kV/mm after immersion in water.

g. The varnish shall meet the minimum volume resistivity requirements of 1x1012 Ohm-Cm in air and 1x108 Ohm-Cm after seven days of immersion in water.

11.4.2 Air drying varnish with temperature index of 130°C

a. The insulating varnish shall have a temperature index of 130°C and it shall be in accordance to IS 10026 part 3 Section 3

b. Preferred make: Dr. Beck, Insular insulating varnish VBR 1600 or equivalent.

11.4.3 Air drying varnish with temperature index of 155°C

a. The insulating varnish shall have a temperature index of 155°C and it shall be in accordance to IS 10026 part 3 Section 6.

b. The varnish shall have the ability to cure in considerable thickness. It shall satisfy the limits “not worse than S.1, U.1 and I 4.1 uniform” when tested according to clause 10 of IS 10026 part 2.

c. The varnish shall not get re-softened easily when tested according to clause 11 of IS 10026 part 2. The re-softening of varnish shall not be worse than „W.2"

d. When the varnish kept in an open vessel, it shall remain stable. The viscosity of the varnish shall not be more than 3 times the original value. No skin formation, precipitation or gelled lumps shall be found in the varnish.

e. The varnish shall be flexible even after heat ageing. No visible damage or detachment of the film on convex side, on bending over a mandrel of diameter 4.75mm.

f. The varnish shall have an electric strength minimum of 35 kV/mm after immersion in water.

g. The bond strength co-efficient of the varnish shall be maximum of 1.3

h. Preferred make: Dr. Beck Elmotherm F 50 or equivalent.

11.4.4 Specification for insulating thinner

a. The insulating thinner shall be suitable for use with air drying varnish class 130. It shall be free from acid/ pungent odour. It shall not blacken or corrode clean metallic copper.

b. Preferred Make: Thinner No. 1600 or equivalent.

11.4.5 Specification for fibre glass sleeves class H varnished

a. Flexible insulated fibre glass sleeve made of 'E' Class Fibre Glass Yarn and varnished with 'H' Class Varnish is recommended for continuous use at 180°C. It shall have good thermal stability, dielectric constant and resistance to moisture & chemicals. The wall thickness of sleeves shall be 0.3 mm or more.

12 Replacement of components

a. Work is to be executed for indoor lighting system (in low bay & high bay areas), street lighting system, motor feeders, kitchen electrical equipment etc. Under this item faulty accessories such as lamps from 9 W to 400W, starters (110V/230V), ignitors, ballasts 9W to 1000 W, lamp holders, starter holders, Tube light holder bracket single/twin type, contactors, bi-metal O/L relays, plug & socket, LED Drivers, street light box etc or items as specified in the Schedule of quantities shall be replaced as per the instruction of the Engineer-in-charge.

b. Wherever supply of components or accessories is included in the schedule, it shall be supplied and replaced in place of faulty component. In case of replacement of accessories, the item supplied shall be of same make and type as the original one being replaced.

c. Supply & Replacement of GI clamp: Galvanised Iron flats are used for fixing street light JBs to street light poles. The GI flat shall be of cross section 25 x 3 mm and shall be shaped to suit the pole cross section. A GI strip of same cross section shall be provided on the rear side of JB connecting the 2 ends of shaped GI flat. 2 Nos. of 6 mm GI nut and bolt shall be supplied and used to fix the JB to the clamp. The galvanisation thickness shall be minimum 80 micron. All the materials required for completion of above work shall be arranged by the contractor. The materials removed shall be handed over to Department and stored at a location identified by the EIC.

d. In case of supply the following points shall be noted:

    i. Electromagnetic control gear BTA 036 x 26 I (M/s Philips or equivalent). The maximum watt loss for the ballast shall be limited to 9 watts.
    ii. TL-D 58W/865 1SL/25 - NG (M/s Philips or equivalent). In case of fluorescent lamps mercury content shall not exceed 3 mg and the life to 50% failure shall be 15000 Hrs or better for the supplied item.

13 Repair/Replacement of heater coils

a. The scope of work involves repair/servicing (including breakdown maintenance) of canteen equipment such as Rice boilers, Idli boilers, Bain Marie heaters, Vanali, Hot plates, Dosa Tawa, immersion heaters, water heaters etc. as directed by the Engineer-in-charge. It also include changing of heating elements as per schedule. Wherever supply of heater coil is not mentioned it will be issued free of cost by the department.

b. The Contractor shall install & test water heater/geysers, immersion heaters in steam boilers etc. It is to be noted that all the accessories required for fixing heater coils are in the scope of the contract. IR value of heater coil shall be checked before and after installation. In case where supply is mentioned in the schedule the heater coil shall be supplied by the contractor under this item. In other cases the heater coil will be issued free of cost by the department.

c. In case of servicing of heating equipment the scope include cleaning, tightening of connections, repair of overheated terminations etc.

d. Wherever installation is involved contractor shall make their own arrangements for installation & testing of water heater/geysers, immersion heaters in steam boilers, heater Coils etc including supply of fixing accessories. Wherever Teflon Wire is required it will be provided as free issue material by the department.

14 Overhauling & Servicing/Painting/Cleaning of fans &

motors 14.1 Overhauling & Servicing/Painting of fans & motors

a. This item covers work on single phase fans / single / three phase motors. All items required for the completion of work shall be supplied by the contractor.

b. The work shall be carried out as per the following procedure:

c. Dismantle the fan or motor from the driven equipment and transport the same to the work spot identified by the Engineer-in-Charge.

d. Check the continuity, IR value, windings resistance value and record the readings.

e. Dismantle the motor and remove the rotor and stator and offer the same for inspection.

f. Check all the coils for their healthiness.

g. For motors check the condition of the overhanging portion and insulation binding of coil. Tape the overhanging portion of the winding wherever required with suitable type of insulation materials.

h. Clean the stator and check wedges for any loose packing. If any wedge found loose, the same may be replaced with new one and well packed.

i. Check the inter coil connection and termination.

j. Check the adequacy of insulation at terminal connections and strengthen the insulation if required.

k. Check the tightness of end core laminations.

l. Apply superior quality insulating varnish and allow it for air drying.

m. Apply epoxy gel coat over the windings as per the instructions of the epoxy manufacturer's manual and as directed by the Engineer-in-Charge.

n. Check the insulation value by using 500 Volts insulation resistance tester and record the same, before and after the Impregnation of coil with varnish / gel coat.

Rotor:

o. Inspect the rotor bars &end rings for any cracks / burning marks and check its healthiness.

p. Clean the rotor free from rust and apply clear insulating varnish on the surface.

q. Check the balancing counter weight for the rotor shaft and fan Hub balancing disc.

r. If anything found abnormal / faulty in the above inspection, the same shall be repaired and made good.

Bearings:

s. Bearing shall be inspected for its healthiness and the same may be re-installed in the motor assembly. In case condition needs replacement, this shall be changed. Required quantity of ball bearings will be supplied by the department free of cost wherever the schedule says so, else will be measured separately as per the relevant schedule item. In case of fans, if required, the supply of bush bearing is in the scope of the contractor.

t. Necessary bearing grease of suitable grade shall be applied to the bearings prior to assembly. Gun metal bearing shall be fixed properly so that it shall not produce excessive heat during its life time operation. The inner bore of the gun metal bush shall be uniform throughout. The faulty gun metal bearing / ball bearing removed shall be returned to department by the contractor. Replace all the gasket, oil seals in the fan / motor at no extra cost.

Assembly and Testing:

u. Assemble the motor and check the air gap between stator and rotor and record the value for future reference. Lubricant shall be applied wherever required, with superior quality grease conforming to IS 719: 1990. All terminal connections shall be checked for tightness.

v. Check the winding resistance and insulation resistance values and record the value. Motor shall be dried by hot air blower. The motor shall be painted with two coats of metal primer and enamel paint of shade light battleship Gray / Blue colour.

w. After the completion of overhauling of motor, the motor shall be put to test for 8 hours and checked for its performance and the parameters such as IR values, coil resistance, no load currents, noise, conditions of ball bearings etc The test results shall be recorded and submitted to the EIC.

x. Transport the motor to its original location, install, align and couple the motor with load. In case of fans after satisfactory completion of testing it shall be transported to the site and installed in position. If the rubber bush in the fan hook is found damaged, required rubber bush for fixing the ceiling fan shall be provided by the contractor free of cost.

y. NOTE: During overhauling the contractor shall take adequate care of the motor winding, bearing, rotor shaft etc. If any physical damage occurred during overhauling, it is the responsibility of the contractor to rectify the same.

z. For painting refer ***clause*** **3** of this document

14.2 Cleaning of fans

a. The scope covers cleaning of ceiling / pedestal / wall mounted / air circulator fans fitted at different heights. Consumables, tools and other materials required for completion of job shall be arranged by the contractor. The fans and its blades shall be cleaned of its dust and dirt as

directed by the EIC. Wherever necessary the fan shall be brought down and installed back after cleaning.

15 Attending to breakdown calls:

15.1 Attending minor breakdown calls

a. The scope covers attending breakdown maintenance of minor nature such as loose connection, open circuit, short circuit, insulation breakdown, altering of connection of cables etc and making the system back to normal. All the consumables, tools and material required for attending the breakdown maintenance shall be arranged by the contractor.

15.2 Attending to break down faults of Motors

a. The Contractor will be given information regarding the particulars of complaints of motors to be attended on that day. Types of motors shall be as per the schedule. Detailed inspection shall be carried out on the motor terminals, incoming / outgoing cable end termination on control gears including checking of all contacts in the control gear for any loose connection of power / control circuits, etc. and faulty components shall be replaced / repaired. While attending the fault on the motor/switch gears, any spares required for the maintenance work will be issued by the department at free of cost. However any consumable required like banian waste, fasteners, bunching tape shall be supplied by the contractor under this item.

15.3 Attending to break down faults in various types of Ceiling / Exhaust / Pedestal / Wall mounting / Air circulator Fans

a. The Contractor will be given information regarding the particulars of complaints of fans to be attended on that day. The Contractor shall inspect fan terminals, condensers, switch, wiring connection etc. While trouble shooting fault, care shall be taken to avoid disturbance to other electrical connection, in the switch board / MCB DB and report to the Engineer-in-Charge about the nature of fault and the action to be taken for the rectification. Spares required for the maintenance work will be issued by the department free of cost. However any consumable required like banian waste, fasteners, bunching tape shall be supplied by the contractor under this item

16 Supply and installation / replacement of following components (motor maintenance)

16.1 Supply and installation of Electronic Regulator for ceiling fans as per scope of work

a. The scope of work under this item includes supply and replacement of fan regulators (electronic type) as per schedule suitable for the existing 230V, 50 Hz ceiling fans. Fan regulator already available shall be removed and shall be replaced with new one with necessary fasteners. Removal of existing wiring connection and reestablishment of connection to regulator shall be in the scope of work. All the items required for the completion of work is included under this item. The old regulator shall be handed over to sectional stores. Regulator shall be checked for variable speed operation for minimum 2 minutes.

b. Preferred make: Crabtree or equivalent

16.2 Supply and installation of protective wire mesh for Fans.

a. Metallic protective mesh guards for pedestal / wall mounting fans shall be supplied and installed under this item. The type and size of the guard shall be as per schedule. In most cases existing guard shall be removed and new one shall be installed. Guard slot gap shall vary between 3 and

12 mm and shall be made of 1 mm (approx) dia mild steel wires with anti corrosive coating. Clear space between rotating fan blades and guard shall be 30 mm (approx) and overall width of protective guard shall be 110 mm (approx). There shall be a locking arrangement to disengage two halves of the guard.

16.3 Supply and replacement of blades for Exhaust / pedestal fans

a. The scope of this item is to replace the blades of Exhaust / pedestal fans. The required blades and fasteners shall be provided by the Contractor. The Exhaust fans are installed at different heights which shall be brought down for replacement of blades and reinstalled back at its original position.

17 Maintenance of MCC / Transformer / Feeder pillar / 4 or 2 pole HV outdoor structures / DB / SFU / Starters etc.

a. The following safety points shall be confirmed before the commencement of work.

b. Corresponding incoming Feeder is Switched Off from the source end and ensure no other back feedings.

c. Line Clear from the Authorized person is obtained.

d. Proper Caution board is displayed on the switch/Breaker.

e. Discharge Rod is connected to the feeder.

17.1 Maintenance on 33 KV 4 pole / 2 pole Structure

a. 33 kV 4 pole structures are part of 33 kV overhead feeder where the conversion from UG cable to OH line takes place. Further the power is transmitted through OH lines supported by 33 kV 2 pole structures.

b. The scope of this item includes the following:

c. Shifting of mobile telescopic ladder and other materials to spot of 4 pole/2 pole structures as required.

d. Cleaning of all insulators with cleaning agent & dry cloths, checking the insulator for cracks, etc.

e. Tightening of all Jumper connections, Earth connections including that at Earth electrodes and replacement of rusted bolts and nuts.

f. Replacement of broken / faulty support insulators/ Disc insulators.

g. Measurement of Earth pit Resistance

h. Measurement of insulation resistance

i. All the required materials will be issued free of cost by the Department.

17.2 Maintenance of PCC / MCC / LT Panels / Feeder Pillar/ EOT crane panel/SF Units

a. Scope of work involves preventive and breakdown maintenance of LT panels /Power Distribution Centres/Motor Control Centres.

b. Physical inspection on the equipment under maintenance is to be carried out and if any abnormality is seen, the same has to be intimated to the Engineer-in-charge immediately.

c. The panel shall be cleaned thoroughly by using blower / waste cloth / cleaning agent etc. and all accumulated dust particles shall be removed. <u>All the required cleaning materials such as Waste cloths, CTC/ Equivalent, Lubrication Oil shall be arranged by the contractor at their own cost.</u>

d. Tightness of all power and control cables shall be checked and loose connections if any shall be tightened.

e. Both the fixed /moving / fuse / power contacts of Switch gear units / Contactors / TPN switch fuse units / MCCB"s is to be cleaned with Toluene (liquid) or equivalent.

f. Measurement and recording Insulation Resistance Value of switch boards / Cables.

g. In case any thermal damage to cable / terminal is observed the same has to be rectified by replacing the faulty jumper / re-termination of the cable as directed by the EIC.

h. In case of failure of any components such as contactor, fuse, indication lamp etc it shall be replaced. Required components / accessories will be issued by the department as free issue material.

i. In case of feeder pillars leak tightness of the enclosure shall be checked and in case of leakage, corrective measures shall be taken as directed by the EIC. Three types of feeder pillars are included namely Type A, B & C depending on the size in descending order.

j. Necessary tests / insulation resistance tests shall be conducted as directed by the EIC before & after the maintenance and the results shall be recorded & submitted to the EIC.

17.3 Maintenance of Power & Lighting DBs

a. Power and lighting Distribution Boards are of different sizes and types which include MCB type & HRC Fuse type. The DBs are either embedded or surface mounted. To complete the maintenance, after mandatory isolation following activities shall be carried out:

b. Cleaning the internal & external surfaces of the DB and the components in the DB.

c. Tightening of earth connections, cable terminals in fuse switch units, DB"s, bus bar terminals in DB"s, terminals in fuses / MCCB, neutral bus connections, etc.

d. Removing of damaged components if any and replacing with new components. Required components will be supplied free of cost by the Dept.

e. After cleaning and tightening of power contacts, a thin layer of Petroleum jelly shall be applied on that.

f. DB circuit details (SLD) shall be updated as per the latest load details and which shall be printed in the approved format & pasted inside the DB as directed by the EIC.

g. <u>All the required cleaning materials such as Waste clothes, cleaning agents like CRC, Lubrication Oil / grease, Petroleum jelly shall be arranged by the contractor at their own cost.</u>

h. <u>Before and after completion of maintenance necessary insulation resistance test shall be conducted as directed by the Engineer-in-Charge.</u>

18 Maintenance of Distribution / Power transformer

a. Distribution/Power transformers are installed at various locations indoor as well as outdoor. Scope of the work under various categories of maintenance is detailed under the sub headings below:

18.1 Annual maintenance on Distribution transformer of capacity 500 kVA to 7 MVA

a. Necessary line clear permit shall be obtained.

b. Opening of cable end box cover (Applicable for transformers connected with power cables and which is not required for transformers with OH line connections)

c. Cleaning of Bushings with CTC / CRC and checking for cracks as directed by the EIC.

d. Disconnection of Neutral and power cable terminations.

e. Shifting of testing equipment and other accessories issued by the Department and arranging Power supply for testing.

f. Measurement of IR Value for all the windings of the Transformer with respect to ground and between the windings

g. Re-termination of power cables and neutral link etc. to bring back the transformer to the original condition.

h. Cleaning of Marshalling Box of the transformer. Checking the wiring tightness, insulation resistance test on control circuitry etc.

i. Checking for proper operation of protective devices such as Bucholz Relay, MOG, Wdg / Oil Temperature indicators, PRV/ Condition of Explosion Vent and its connection in the control circuitry. Attending to control circuit defects if any.

j. Winding resistance of all the windings of the transformer shall be measured with Kelvin's bridge / Low Resistance Kit, after making necessary disconnections. The connection shall be restored after the work.

k. Providing Assistance for Testing of Over Current and Earth fault Relays (Numerical / Electro mechanical), Auxiliary Relays.

l. Shifting of required quantity of Transformer oil to the spot, topping up in conservator and shifting back old oil to the storage place.

m. Opening the Disconnecting Chamber, Removal/Connection of Links & Heat shrinkable sleeves, cleaning the chamber, Links, Sleeves, Filling it with new oil and closing back the chamber with new gaskets.

n. Collection of oil sample from the top & bottom of the transformer and test for BDV

o. Inspection and replacement of Diaphragm in Explosion vent if required.

p. Free issue items to contractor for this work: - Transformer Oil, CRC, Bolts & nuts, diaphragm of explosion vent. All other tools and consumables required for completion of the work shall be arranged by the contractor.

18.2 Half yearly maintenance on Distribution transformer of capacity 500 kVA to 7 MVA

a. Under this items all activities in ***clause 18.1 except sr. no. j. & k. shall be carried out. Free issue items are the same as provided in this clause.***

18.3 Annual maintenance on Power transformer of capacity above 7 MVA and up to 20 MVA.

a. Under this item all activities in ***clause 18.1 shall be carried out. In addition to that the following activities also are required to be done under this item. Free issue items are the same as that provided in this clause***

b. Test Running of Cooler Fans & checking for abnormalities & attending to minor defects if any.

c. Testing of Operation of mulsyfire system as per the requirement and as directed by Engineer-in-charge.

d. Free issue items to contractor for this work: Transformer Oil, CRC, Bolts & nuts etc. All other tools and consumables required for completion of the work shall be arranged by the contractor.

18.4 Half yearly maintenance on Power transformer of capacity above 7 MVA and up to 20 MVA.

a. Under this item all activities in ***clause 18.1 except sr. no. j. & k. shall be carried out. In addition to that the following activity also are required to be done under this item. Free issue items are the same as provided in this clause.***

b. Test Running of Cooler Fans & checking for abnormalities & attending to minor defects if any.

19 Removal of equipment

a. Following points are applicable under this item:

b. Items such as MS boxes, switch boxes, GI / PVC conduits, Fans etc. are to be removed carefully from the installed location, transported and handed over to sectional stores after cleaning. Damage to the items are not acceptable.

c. MS boxes or switch boxes are either surface mounted or installed on panels externally / internally.

d. GI or PVC conduits are surface mounted with the help of spacer and clamps. Removal includes removal and handing over of associated spacer and clamps as well.

e. Types of fans include ceiling, wall mounted, exhaust, air circulators etc installed at various heights.

f. After removal the opening caused shall be covered with hylem sheet / GI sheet which will be issued by department.

20 Oil filtration/testing/ Breather /Recording reading

20.1 Operation of Transformer Oil Filtration plant

a. Transformer oil Filtration Plant provided by the department shall be operated as directed by the EIC to recondition the Transformer oil in Transformers/ Drums / Storage tank.

b. The Filtration process shall be carried out continuously by arranging minimum of three persons for each shift. The filtration shall be continued till the expected IR value / BDV is attained. The contractor shall depute a separate crew for each shift to continue the filtration.

c. Shifting of filtration plant along with accessories like oil hoses, cable for power supply, oil drum etc to the work site.

d. Necessary hose connection, power supply connection, earth connection, cleaning of the plant, minor repair / replacement of components, etc. and other works necessary for the operation of the plant shall be done.

e. Periodical measurement of IR value of Transformer, testing of BDV of oil samples etc shall be done as instructed by EIC.

f. Measurement for this item will be done in hours of operation of filtration plant.

20.2 Recording of Hourly Reading of Electrical Parameters

a. Recording of electrical parameters like Voltage, Current, Frequency, Power, Power factor, etc. of 33kV / 11kV / 6.6kV / 415V system switch board for testing / analysis purposes.

b. For this work, the contractor shall depute a qualified electrician having “B” Electrical license and reading shall be recorded for every half an hour / hourly as directed by the Engineer-in-Charge.

c. Necessary register for recording the parameters will be provided by the Department free of cost.

20.3 BDV Test for Transformer oil

a. Under this item transformer oil samples are to be collected in glass bottles as per the approved procedure. The bottle used shall be cleaned thoroughly and dried. Before taking the sample the bottle shall be rinsed with the oil from transformer. Oil to be collected without formation of air bubbles.

b. Oil sample to be tested for Break Down Voltage as directed by the EIC using the test kit provided by the dept free of cost. The readings are to be tabulated and submitted to the EIC.

21 Installation/Removal/Replacement of different type of light fixtures

a. The work shall be carried out in indoor low bay / high bay and outdoor areas. Areas and type of light fixtures shall be as per the schedule. In case of installation or replacement, the light fixtures will be issued by the department as free issue material. Necessary fasteners shall be provided by the contractor. The accessories like ball and socket, junction boxes, down rods if any required for completion of installation shall be in the scope of the contractor. After installation the luminaire shall be tested for satisfactory performance.

b. In case of removal, the removed items shall be returned to the sectional stores.

22 Attending to Fuse off calls in various lab / buildings

a. This item covers building lighting, small power & telephone systems as specified in the Schedule. Contract supervisor shall collect the Fuse Off call details from the Engineer-in-Charge every morning. The contractor shall depute sufficient teams regularly to attend day to day faults in the lighting or power installations in various labs/buildings including high bays. A record shall be maintained with details of faults attended, including lab/building name room number, circuit number with date. The fault shall be cleared with minimum down period without any disturbance to other electric circuits in the MCB DB. Any emergency calls arising during any time of the day will be communicated to the contract supervisor and it shall be attended on priority. The components removed shall be returned to the Sectional stores. All the components / accessories will be provided by the Department at free of cost unless otherwise specified in the schedule. All necessary items like bunching tape, fasteners required etc shall be supplied by the contractor.

23 Maintenance of Solar Water Heater and solar cooking systems at different locations

a. The scope of work includes cleaning of solar panels of solar water heaters. In case of solar cooker it has reflectors of 16 Sq metre area in ground at south Cafeteria. The cleaning shall be done with waste cloth and then with water jet. Water tap is provided at the site nearer to the solar panels and the water required for cleaning can be taped from this and no charge will be levied for water. Necessary banian waste cloth has to be procured and used by contractor. The contractor shall depute skilled person to clean the solar panels with dry cloth without scratching / damaging the panel as per the instructions of the Engineer-in-charge.

24 Inspection and testing of various electrical equipment/ components

a. Various electrical items received at central stores or sectional stores are to be inspected & tested for satisfactory performance. The items include fans of various types as specified in schedule, motors of different capacities, light fittings/lamps/ballast/ignitors/starters, switch boxes etc. The activity shall be planned in such a way that the time spent in stores is minimum. Power supply shall be derived from the nearest power point by the contractor which will not be charged. Generally items picked up at random will only be tested and the testing has to be conducted as per the instruction of Engineer-in-charge. The scope of work also includes counting of received materials. Damages/ short supply noticed during the inspection shall be brought to the notice of Engineer-in-charge. The materials tested shall be repacked and stacked neatly.

b. The scope is not only restricted to inspection & testing at central / sectional stores but also at labs / General office areas.

25 Maintenance of service connection

a. The scope of work includes the following:

b. Checking the tightness of all power and control cable connections as well as earthing connections. This include power and control cable terminals, energy meter connection, CT wiring, outgoing Cable terminals, ELCB connection, earthing wire connection etc.

c. If the existing energy meter is faulty the same shall be removed and replaced with new energy meter. Department will issue the meter free of cost. Other hard wares / fasteners required for fixing the meter shall be in the scope of the contractor

d. Service connection box shall be painted with 1 coat of enamel paint. One coat of red oxide shall be applied wherever the surface is found to be rusted after removing the rust. For painting procedure to be followed as per ***clause*** **3** for painting of feeder pillars.

26 Cleaning of Cable Trenches

a. The power cables laid through Cable trenches in various buildings or substations shall be cleaned of dirt and unwanted materials as directed by the Engineer-in-charge. Minor maintenance works such as replacement of corroded bolts and nuts are also included under this item including supply of bolts & nuts.

b. The cable trenches are covered mostly with MS chequered plates and sometimes by RCC slab. The cover plate/slab shall be properly identified and removed before the start of cleaning work. The removed covers shall be neatly stacked. After completion of the cleaning the covers shall be restored to the original position or as directed by the Engineer-in-Charge.

c. Cable trenches are of different cross sections, starting from 500 x 500 mm to 1500 x 1500 mm. Measurement will be done in running meter basis.

d. Water stagnation if any found shall be dewatered. Dewatering pump will be given by department. Power supply for the pumping purpose shall be extended from the nearest point.

e. All items except dewatering pump (if required) for cleaning trench / tunnel shall be arranged by the contractor.

27 Disconnection of service connection

a. The scope of work includes disconnection of service connection meter board, removing of cables, energy meter etc. The disconnected items shall be safely transported to storage area identified by the Engineer- in- Charge within a distance of 10kM.

b. The terminal point of the cable shall be covered as directed by EIC to avoid ingress of water/dirt.

c. The cable to service connection board may be in built in trench/ open laying / buried in ground. The contractor shall safely retrieve the cables for further use. Excavation required for this work will be measured separately. The items obtained during process of retrieval ie. Bricks, clamps, bolts if any shall be handed over to sectional stores.

28 Collecting and shifting of scrap items

a. Collecting and shifting of scrap items within a specified distance as per the schedule. Measurement will be done on volume basis.

b. Scrap items of various materials including plastics, metals, cables, paper etc are to be collected from multiple locations and transported to a place identified by the Engineer-in-Charge. The lead distance shall be as specified in the BOQ.

c. Sorting of items shall be done during collection. Items shall be separated & sorted in to usable or unusable items. Usable scrap items shall be weighed on Weigh Bridge inside the campus and transported to stores. Other items shall be transported to dump yard identified by the Engineer-in-Charge.

d. The scope covers hiring material handling equipment like crane/truck for transportation.

29 Providing Service connection

a. Service connections are extended to meet the construction power requirements. It will generally be metered. One No. free standing service connection board with energy meter, cable termination facilities, fuses/MCB, earth wire etc will be issued to the contractor. This has to be transported and installed at the required location which can be indoor or outdoor. Steps involved are listed below:

b. Transportation, Installation of free standing Service Connection board (Energy Meter Board), power cables (Length up to 30 Mtrs and of size up to 3.5C x 70 Sq. mm), earthing conductors, etc.

c. Levelling of floor for proper installation and providing adequate supports required for installation of boards are in the scope of the work.

d. Providing double earth to Service Connection board using earthing conductor.

e. Installation of cables (Length up to 30 Mtrs and of size up to 3.5C x 70 Sq. mm) and termination of cables on both ends namely supply point and Energy Meter board. Installation of cable shall be carried out as per the procedure given for temporary cable laying under ***Clause 30 . If the length of cable laid exceeds the limit of 30 m, it will be measured separately under temporary cable laying. Termination of cables will be measured separately.***

f. After completion of installation work the Service Connection board shall be tested, meter details & initial readings recorded as directed by the Engineer-in-Charge and energise the board.

30 Temporary Laying of Cables

a. The scope of work includes transportation of cables from Central stores/CWCP cable yard checking the healthiness of cable, shifting the required quantity of cable from cable yard to work site, unwinding (undue axial pulling force should not be exerted on the cables), Laying in open air for providing temporary power supply to various constructional sites as instructed by the Engineer-in- Charge. The cables shall not be laid on the ground and shall be firmly tied to wooden / metal supporting poles at regular intervals such that temporary cable shall not create any obstruction to personal/ Material/Vehicle movement. Wherever structures are available it can be used for fastening the cables with the approval of Engineer-in-Charge. The contractor shall make their own arrangement for supporting poles.

b. Whenever the temporary cables are laid in built-in trenches, the contractor shall lay the cables in the cable tray where cable density is less and shall fasten the cables with the tray by cable ties or as directed by the EIC.

c. Cables will be provided by the Department Free of cost.

d. End termination of the cable will be measured separately

31 Shifting of equipment

a. Equipment identified by Engineer-in-Charge shall be transported to the designated location. Schedule is classified based on the size of equipment. Smaller items weighing less than 100 kgs will be clubbed and measured as 1 No, for combined weight between 100 and 150 kg whichever is lower. Distance to be shifted shall be as per schedule of quantities. Measurement will be done on number basis. All care shall be taken to avoid any damage to the equipment.

b. In case of transformer oil filtration machine trailer arrangement shall be made for shifting. Hiring of crane, truck etc. shall be arranged by the contractor. Contractor shall ensure sling of adequate capacity is used while handling heavy equipment and follow safe practices while shifting the heavy equipments.

32 Shifting of cable drums

a. The scope includes transportation of empty / partially loaded cable drums of various sizes within a distance as given in the schedule. For short distances rolling of drums will be permitted based on the condition of drum. Care shall be taken not to damage the roads/ pathways while rolling the drums. In case the drums are not fit for rolling, crane/truck shall be arranged by the contractor for shifting. All safety procedures shall be followed while handling the cable drums.

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SECTION VII

PART – I: LIST OF DRAWINGS

S.No.	Description of Drawing	Drawing No.	No.of Pages
1	Power control centre Panel	IGC/MC&MFCG/PPED/2021/10	1
2	Motor control centre Panel	IGC/MC&MFCG/PPED/2021/09	1

PART – II: PREFERRED MAKES OF MATERIALS

S.No.	Name of Items	Preferred Makes
1	Light Fixtures	Crompton / Philips
2	Lugs	Dowells / Prabhat / Jainson / Lotus / Comet
3	Synthetic Enamel Paints&Polyurethanepaints	Asian/ Berger / Nerolac / MRF
4	MS Items	GK Electrical/Periyandavar/SAIL/VSL
5	Insulation Mat	Premier Polyfilm Ltd / Alin Engg.

Section – VIII
SCHEDULE OF OFFERED ITEMS AND RATES

Ref: IGC/MC&MFCG/ PPED/ PPEMS/ELE/AKSK/04/2025

Name of work: Contract for Periodic preventive maintenance of Electrical power distribution, Motor control centre (MCC) & blower motors, Furnace equipments with control panel and various electrical works in the PPRDF at MC&MFCG, IGCAR, Kalpakkam.

S.No	Description of Item	Quantity	Unit
1	Maintenance of LT 415 Volt Power Control Centre Panel as per the detailed specification. (Refer Section VI MNC Clause No.17.2 & Drawing No.IGC/MC&MFCG/PPED/2021/10) .	6	Nos.
2	Maintenance of LT 415 Volt Motor Control Centre Panel as per the detailed specification. (Refer Section VI MNC & Clause No.17.2 & Drawing No.IGC/MC&MFCG/PPED/2021/09).	12	Nos.
3	Maintenance of LT 415 Volt Heater Control Panel as per the detailed specification. (Refer Section V, Clause No.11).	60	Nos.
4	Maintenance of LT 415 Volt Starter Control Panel as per the detailed specification. (Refer Section V, Clause No.12).	60	Nos.
5	Maintenance of LT 415 Volt VTPN/TPN/SPN Power distribution board / TPN switches as per the detailed specification. (Refer Section VI MNC, Clause No.17.3).	200	Nos.
6	Maintenance of Earth Pits including supply of Sodium Bentonite, and measurement of Earth Pit Resistance as per the specification. (Refer Sec VI (MNC), Clause No.2).	60	Nos.
7	Preventive and Breakdown maintenance of ECR/TAPE/CORD heaters up to 3kW for salt heating vessel and pipeline as per the detailed specification. (Refer Section V, Clause No.13).	400	Sq.Mtr
8	Overhauling, Painting and test running of the following single/three phase motors as per the scope of work. (Refer Sec VI (MNC), Clause No.14.1).		
8.1	Above 0.5 HP and upto 2.0 HP Motor	40	Nos.
8.2	3.0 HP/5.0 HP Motor	60	Nos.
8.3	7.5 HP/10 HP Motor	40	Nos.

8.4	20.0 HP/25.0 HP Motor	10	Nos.
8.5	30.0 HP/35.0/40.0 HP Motor	5	Nos.
9	Supply and Installation of MS Brackets, Supports, Frame work, Clamps, Base Channels, etc. fabricated out of angle / Channel / Rods etc. The rate quoted shall include the cost of fabrication / welding, cleaning and painting/ galvanising as follows including supply of required, fasteners, nuts, washers, etc.(Refer Sec VI, Clause No.11).		
9.1	MS fabrication 1 coat primer & 2 coats synthetic enamel paint	200	Kgs.
10	End Termination of the following sizes of Aluminium Conductor PVC Insulated and sheathed armoured UG Cable using Single Compression, Heavy Duty, Gland connecting the cable to the equipment such as Switches/Panel Boards etc. using Comet or equivalent make Aluminium crimping lugs as directed by Engineer-in-Charge. The rate shall include the cost of supply of Cable Gland and Lugs. The Contractor shall arrange for making holes wherever necessary for fixing cable gland. (Refer Sec VI, Clause No.10.1).		
10.1	4 Core x 10 sq.mm	10	Nos.
10.2	3.5/4 C x 35 sq.mm	10	Nos.
10.3	3.5/4C x 50/70 sq.mm	10	Nos.
11	Surveillance and performance check of UPS system up to 10 kVA as per detailed specification. (Refer Sec V, Clause No.14).	48	Nos.
12	Overhauling and servicing of ceiling /pedestal/wall mounting / Exhaust/Air circulator fans (single phase) as per the Scope of work. (Refer Sec VI (MNC), Clause No.14).	100	Nos.
13	Testing of VFD range from 3.5 kw to 18.5 kw as per detailed specification. (Refer Sec V, Clause No.15).	100	Nos.
14	Testing of PLC consisting of 12 nos. I/O Module as per detailed specification. (Refer Sec V, Clause No.16).	20	Nos.
15	Supply, cleaning the floor, proper pasting and installation of following insulating mat as per specification. (Refer Sec VI, Clause No.25).		
15.1	2.0 mm thickness, Max useable voltage 3.3kV, AC Proof voltage 10kV for 3 minutes, AC dielectric strength 30kV RMS Insulating Mat confirming to IS:15652.	10	Sq.Mtr
16	Supply and Installation of recess mounted LED light fitting of Philips make RC360LED 36S 6500K (36W) or equivalent as per detailed specification. (Refer Sec V, Clause No.17).	10	Nos.

17	Supply and Installation of Philips make BVP175/100W Flood Light Fitting or equivalent as per detailed specification. (Refer Sec V, Clause No.18).	10	Nos.
18	Supply and Installation of Philips make BN021 LED 40W batten type LED light fitting or equivalent as per detailed specification. (Refer Sec V, Clause No.19).	50	Nos.
19	Supply and Installation of Philips BN308 LED20S 40W batten type LED light fitting or equivalent as per detailed specification. (Refer Sec V, Clause No.20).	10	Nos.

Note: The rate quoted shall be inclusive of GST.

SECTION - IX
CONTROL OF WORKS
(CONTRACTORS)

1. INTRODUCTION

1.1 General

The Department of Atomic Energy (DAE) through its constituent units executes various site works either by their own manpower or by manpower of various outside agencies. The nature of contracts with outside agencies can be works contracts, engineering procurement contracts, purchase contracts, minor fabrication contracts etc. These site works involve entire gamut of conventional industrial activities like excavation, rock blasting, earth handling, construction, material handling, fabrication, installation, operation, maintenance etc. of nuclear or conventional plants/facilities. This is a challenging responsibility for the contractor due to the complexity of problems like quality of workforce (which may be unskilled, illiterate, migratory) available for labor-intensive jobs, lack of coordination among agencies at site, lack of safety awareness among concerned authorities, time schedules of project etc. As a principal employer, facility management shall be responsible to ensure health and safety of all personnel engaged for the work. In this process, the contractor through his established measures shall ensure that the guidelines are implemented. However the facility management shall monitor the compliance with the provisions outlined in the guidelines through periodic supervision and review. Any accidental injury or loss of life is detrimental to the facility as well as the society. This 'guidelines' covers the safety organization and the safety management system requirements in sections two and three. The work specific safety precautions are covered in section four. The requirements relating to personal protective equipment and medical management are covered in sections 5 and 6.

1.2 Objective

This 'guidelines' has a basic framework of industrial safety organization, safety management systems, safe work procedures to maintain a safe working environment for all personnel and to prevent any unsafe condition/act endangering the life of personnel engaged for industrial activities. The major objectives of this 'guidelines' are:

i. To create awareness among workers about industrial hazards and safe working procedures.
ii. To lay down safe work procedures and systems to be followed for different type of industrial activities.
iii. To establish a robust safety management system.
iv. To protect the health and ensure the safety of the workers from industrial activities.

1.3 Scope

This 'guidelines' is essential for implementation and assurance of conventional safety in areas such as industrial, chemical, electrical, fire, environmental and is applicable for all works executed through contracts, like engineering procurement contract, minor fabrication contract etc. Where the execution of work is envisaged in radiation controlled area or involves handling and fabrication of any nuclear material, additional precautions noted in relevant AERB safety documents on radiation protection shall also be applicable.

2. SAFETY ORGANISATION

2.1 General

(a) Construction projects have significant health and safety hazards, which need to be managed systematically since the project inception stage to achieve incident- free completion of jobs. Contractor should have well-defined safety organization which helps in effective implementation of safety management systems and ensures health and safety of workers.
(b) The top management of contractor should assure that all the provisions of relevant Acts & Rules are conformed to.
(c) Safety organization should carry out safety surveillance, safety training, safety enforcement measures, safety audit etc. related to all works to fulfill the overall safety requirements of this 'guidelines'.
(d) Safety functionaries should be exclusively assigned with the work related to protection of health and safety of workers.

(e) IS: 18001: 2007 gives detailed requirements of health and safety management system requirements. IS: 15793 gives requirements of good practices for managing environment, occupational health and safety legal compliance. This 'guidelines' prescribes requirements in addition to IS: 18001:2007 and IS: 15793 and gives guidelines on implementing these specific to a construction project.

(f) The requirements prescribed in various central and state regulations including *Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act*, 1996 and rules framed there under with respect to managing health and safety in construction projects, shall be complied with.

2.2 Organizational Structure for Safety Management

(a) The Contractor shall deploy qualified and experienced line management personnel for supervising the jobs to be carried out safely by workers. In order to oversee the industrial and fire safety aspects during execution of hazardous jobs by the contractors, at least one safety supervisor with the qualifications and experience mentioned in Table -2 shall be in place irrespective of the man power deployed by the contractor.

(b) The qualification, experience and the minimum number of safety professionals to be employed by contractor shall be as per the following table:

TABLE-1 : QUALIFICATION, EXPERIENCE AND NUMBER OF SAFETY PROFESSIONALS FOR CONSTRUCTION PROJECTS

Category of safety person	Mandatory requirement	Qualification
Safety officer	One in each shift (minimum) up to 1000 workers. If number of workers in a shift (including contractor's workers) exceeds 1000, additionally one safety officer should be deployed for every 1000 workers or part thereof.	Degree in engineering/ technology and diploma in industrial safety with minimum two years of experience or Diploma in engineering with diploma in industrial safety with minimum 6 years experience or A recognized degree in physics or chemistry and has practical experience of working in a factory in a supervisory capacity for a period of not less than 5 years. Notwithstanding the provision contained in the above criteria any person who (i) possesses a recognized degree or diploma in engineering or technology and has experience of not less than five years in a department of the central or state government which deals with the administration of the Factories Act, 1948 or the Dock Workers (safety, health and welfare) Act, 1986 (54 of 1986) or (ii) Possesses a recognized degree or diploma in engineering or technology and has experience of not less than 5 years, fulltime on training, education, consultancy, or research in the field of accident prevention in industry or in any institution, shall also be eligible for appointment as a safety officer: Provided that competent authority may, subject to such condition as it may specify, grant exemption from the requirement of this sub rule if in its opinion, a suitable person possessing the necessary qualification and experience is not available for appointment.

TABLE-2 : QUALIFICATION, EXPERIENCE AND NUMBER OF SAFETY PROFESSIONALS FOR CONSTRUCTION PROJECTS (CONTD.)

Category of safety person	Mandatory requirement	Qualification
Safety supervisor	One in each shift (minimum) up to 500 workers or One Supervisor for any hazardous job if, carried out by Contractor irrespective of number of workers. If number of persons working in a shift (including the contractors' workers) exceeds 500, additionally one safety supervisor should be deployed for every 500 workers or part thereof.	Diploma in engineering and diploma in industrial safety

3. SAFETY MANAGEMENT

3.1 General

The construction agencies (contractors) shall be asked to submit a project specific health and safety plan (construction safety management plan) proposing the methodology for managing health and safety and their capability in completing the project in a safe manner.

3.2 Safety Policy

(a) The facility and the construction agency jointly or separately shall have a written statement prescribing the health and safety policy of the organization. The health and safety policy conveys the management commitment and intent of the organization towards health and safety, its organization and arrangements to ensure that the set objectives are met. It also provides a framework for establishing, maintaining and periodically reviewing health and safety objectives and targets.

(b) Health and safety policy shall meet the requirements of *Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act*, 1996 and IS 18001.

(c) The policy shall be communicated to all stakeholders through display and other means. The policy shall be displayed in local language(s) which may be understood by majority of the workmen.

3.3 Safety Plan

(a) A project specific health and safety plan shall be developed by the contractor and approved by the facility.

On approval by the facility, health and safety plan shall be reference document for implementation, control and monitoring of health and safety aspects of the project by the Contractor.

(b) Project health and safety plan shall describe how the project specific health and safety objectives and targets shall be achieved. It shall define the road map for achieving the standards that an organization lays down for itself so that efforts can be coordinated, synergized and monitored.

(c) Health and safety plan shall explain the means of establishing a positive health and safety culture at the project site. Health and safety plan shall identify and enumerate the control measures to mitigate the risks to the project completion arising out of health and safety issues so that the project is allowed to proceed without interruption and executed as per schedule.

Salient aspects that may be covered in the project health and safety plan are:

(i) Project specific health and safety objectives, targets and programmes in line with health and safety policy.

(ii) Hazard identification and risk assessment
(iii) Meeting legal and other requirements
(iv) Health and safety organization
(v) Resources, roles, responsibility and authority
(vi) General health and safety rules
(vii) Health and safety requirements to be followed by subcontractors
(viii) Operation control procedure
(ix) Activities requiring work permit system and its procedure
(x) Management of traffic safety inside the project
(xi) Access control of employees
(xii) Safety of visitors
(xiii) Management of critical activities such as work at height, material handling, working with plant and machinery, etc.
(xiv) Safe handling of chemicals, explosives, gas cylinders, electrical equipment etc.
(xv) Ensuring the competency and awareness of the workmen
(xvi) Fire prevention and fire fighting plan
(xvii) Emergency preparedness and response plan
(xviii) Traffic management plan
(xix) Training matrix
(xx) Personal protective equipment matrix
(xxi) Health and safety performance monitoring measures such as inspection and audit
(xxii) Incident reporting and investigation procedure
(xxiii) Proactive and reactive indicators of health and safety
(xxiv) Reward and reprimand for health and safety performance
(xxv) Checklist and formats.
(xxvi) Health monitoring plan for employees/workers exposed to hazardous jobs.

(d) The risk control measures identified shall meet the provisions of *Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act*, 1996, other legislations and provisions of various safety related standards.

(e) Procedures shall be established for timely recording and reporting of information required for continual improvement of health and safety performance.

(i) Incident reporting
(ii) Non-conformance reporting
(iii) Health and safety performance reporting
(iv) Hazard identification reporting
External reporting shall cover
(i) Statutory reporting requirements
The recording of reporting of health and safety performance shall be clearly documented in the health and safety plan.

3.4 Roles, Responsibility and Authority

(a) Contractor shall define, document and communicate the roles, responsibilities and authorities of all personnel who manage, perform and verify activities having an effect on health and safety risks. It shall also include subcontractors and visitors.
(b) The line management personnel who are responsible for execution of activities are directly responsible for health and safety in the work under their control.
(c) Health and safety group and health and safety officers are responsible for guiding the top management of their own organization on health and safety issues and facilitating the implementation of health and safety in the project site. For duties and responsibilities of health and safety officers refer Atomic Energy (Factories) Rules-1996.
(d) Health and safety supervisors shall be engaged to assist the health and safety officers in performing their duties.
(e) Management shall provide adequate resources essential to effectively manage the health and safety management system requirements of the project.

3.5 Design and Engineering

(a) Design drawings, construction methodology and plans shall be reviewed to determine whether any additional risks may arise during the construction due to the features in the design or methodology.
Attention shall be paid to:
(i) Providing permanent hooks and loops for tying safety slings of workers
(ii) Providing holes or such arrangements to the structure to which safe working platforms and safety nets can be connected
(iii) Laying permanent slings, grab rails/bars to be used by the workers
(iv) Permanent provision for attaching railings
(v) Provision for alternative access to the trapped or distressed workers
(vi) Provision for communication
(vii) Design facilitating barricading of the area around work site without causing hindrance to building functional activities
(viii) Durability of such safety related permanent design integrated elements
(ix) Other safety practices required for the type of woks involved
(x) Significant risks from construction materials, which cannot be avoided in the design.

(b) Analysis of design and integration of safety measures, as described above, should be undertaken as value engineering through multi-stakeholder consultation, necessarily involving designers, owner/ client, operation/maintenance management and construction agency.

(c) While need for special work methodology and enabling infrastructure is considered to make conditions safe for construction, attention shall also be drawn to the safety during maintenance operations (including inspections which may be necessary before project commissioning as well as maintenance).

(d) It shall also be ascertained whether it would be feasible (within the time and cost considerations) to erect necessary temporary enabling infrastructure. If, in the due assessment by the project manager, it is established that the design, as proposed, would continue to be unsafe during construction and maintenance operations unless special enabling infrastructure is created and work procedures specifically drawn, the design shall be reviewed.

3.6 Construction Planning

(a) Prior to the start of construction work, detailed planning shall be carried out which may include:
(i) Identifying aspects of design that have bearing on health and safety during construction stage.
(ii) While scheduling the various activities of the construction, allowing adequate time to carry work in accordance with health and safety requirements.
(iii) Reviewing the proposed work method of various activities, identifying health and safety hazards of activities in the project and assessment of the risk level.
(iv) When the risk level is unacceptable, taking additional control measures including revision of the work methodology so that identified risk is at ALARP (As Low as Reasonably Practicable) level.
(v) Planning and establishing the facilities for implementation of health and safety such as workmen training facility, health centre for medical check-up and first aid, access control of employees, etc.
(vi) Ensuring that the temporary establishments at project site such as site offices, workmen camps, toilets, canteens and rest sheds, etc. are created meeting the requirements of the relevant statutes and standards.
(b) Facility shall ensure that the construction agency has understood the challenges and has planned to meet the project specific health and safety requirement through appropriate competencies.
(c) Health and safety measures need proper coordination by the construction agency and such efforts of the construction agency shall be reviewed, monitored and appropriately guided by the facility.
(d) In respect of sub-contractors, project manager of the construction agency shall ensure that the sub-contractors meet the health and safety requirements of the project. Health and safety control and monitoring shall be established specific to the needs of the project.

3.7 Safety Communication

(a) Procedures shall be established to communicate significant hazards and risks to and from employees and other interested parties. The health and safety hazards and risks may be communicated in the following ways:

(b) Sharing of accidents case studies which occurred in the project site as well in other similar projects
i. Safety induction and orientation training
ii. Health and safety posters and displays
iii. Health and safety campaigns and competition involving the employees
iv. Sharing of results of the audits, inspections and other monitoring systems
v. Establishing a system for collecting feedback on health and safety from employees and other interested parties
vi. Tool box meeting
vii. Safety signage.

(c) Health and safety communications addressed to workmen shall preferably be in local language(s) understandable by majority of the workmen.

(i) The facility and construction agency shall jointly endeavor to promote a positive health and safety culture at the project. Top management of the organizations should exhibit a visible management commitment and felt leadership towards health and safety. This shall be achieved by participating in health and safety programs such as:
(ii) Project health and safety committee meeting
(iii) Health and safety walk down
(iv) Including health and safety in all performance review meetings
(v) Exhibiting a safe behavior while at site.

(d) The top management should clearly communicate that it considers safety as core value and it shall not allow it to get compromised. Such messages when it reaches down the level in the organization enable to create a positive health and safety culture.

3.8 Safety Monitoring Program

(a) The objective of the safety surveillance program should address assurance of effective implementation of safety measures in execution of works. Following surveillance program should be in place at sites. The safety organization should monitor, maintain record and follow up for corrective actions.

(b) The surveillance program should consist of identification of safety related deficiencies and status of

corrections thereof, the implementation of protective measures, the safe work practices, human behavior etc.

(c) Specific surveillance should be ensured with respect to testing of equipment, portable power tools, electrical equipment and tools, hand tools, surveillance of material handling equipment, transport equipment, earth moving equipment, gas cylinders, stores, etc. to comply with various statutory requirements.

(d) Surveillance on safety awareness and training compliance including induction training, on the job training and refresher training, job specific pre-job briefing, job hazard analysis, etc. as per facility's guidelines should be ensured.

(e) Safety related deficiencies (SRDs) shall be detected by any employees/worker of construction agency and communicated to the line manager for corrective actions. The corrective action shall be monitored and records shall be maintained.

(f) Systematic updating of SRDs attended and pending should be made available by the contractor for verification of facility.

(g) The health and safety performance monitoring and measurement procedures shall provide for:

(i) Both qualitative and quantitative measures appropriate to the project
(ii) Monitoring the extent to which project health and safety objectives are met
(iii) Proactive measures of compliance that measures compliance with health and safety plan, operational control procedures and legislation
(iv) Reactive measures of performance to monitor accidents, ill health, near misses and non-conformances
(v) Monitoring dangerous occurrences
(vi) Fire occurrences
(vi) First aid injuries.

(h) Health and safety inspections shall be preferably conducted by a team of the concerned engineer, health and safety officer and area in-charge of the contractor.

(i) The type of inspections that shall be carried out and the frequency shall be decided during the planning stage and documented in the project health and safety plan. The health and safety inspections should include:
(i) General site health and safety inspection
(ii) Electrical safety inspection
(iii) Plant and machinery inspection
(iv) Health and hygiene inspection
(v) Scaffolding safety inspection.
(vi) Portable tools and tackles
(vii) Lifting tools and tackles
(viii) Fire equipment inspections
(ix) Illumination level and noise level monitoring

(j) Status of health and safety implementation shall be measured and monitored by several proactive indicators which include the following:
(i) Compliance level of project health and safety plan
(ii) Compliance level of health and safety observations with in the target date
(iii) Implementation status of training plan
(iv) Implementation status of corrective and preventive actions
(v) Compliance level of pre-employment medical checks and periodic medical checkups
(vi) Compliance level of legal and other requirements
(vii) Percentage of activities for which detailed project specific risk assessment is conducted.

(k) Procedures shall be established to report, investigate and analyze incidents. The procedures shall involve:

(i) Members of the incident investigation team
(ii) Agencies to be reported in case of incidents
(iii) Time period within which incidents need to be reported
(iv) Methodology for investigation and determining the root cause of accidents.

These procedures shall form a part of the project health and safety plan and monitored on a regular basis for its effectiveness.

(l) All incidents including near miss cases, accidents and dangerous occurrences shall be thoroughly investigated, direct and root causes determined and corrective action planned. Incidents may be analyzed covering the following ways to prepare and implement an effective prevention plan:
(i) Body part injured
(ii) Age of the victims
(iii) Time of accidents
(iv) Causes of accidents
(v) Nature of injury.

For detailed guidelines on analysis of incidents and computation of injury rate refer IS 3786.

(m) The following reactive health and safety indicators should be used to measure and monitor the health and safety performance of the project site:

(i) Number of near miss cases
(ii) Number of first aid cases
(iii) Lost time injury frequency rate
(iv) Lost time injury severity rate.

(n) The health and safety performance of subcontractors shall be monitored on a regular basis and necessary directive and support shall be given to achieve the set health and safety objectives and targets.

(o) All accidents leading to property damage/personnel injuries/fatal accident/near miss and dangerous occurrence should be reported to the facility's engineer-in-charge immediately.

(p) All 'near-miss' accidents should also be recorded/reported and investigated and recommendations arising out should be implemented on priority.

3.9 Training/Orientation

(a) It shall be ensured that all employees are competent to perform the assigned work safely on the basis of appropriate education, training or experience. The competency requirements of different categories of employees shall be mapped and procedures shall be implemented to ensure that those deployed meet the competence requirements.

(b) The objective of health and safety training shall be to equip the employee with necessary knowledge and skill to perform the work assigned to him in a safe manner, to foster continual improvement and to imbibe safety culture.

(c) Preferably, the training should be carried out away from the working place of the participants to ensure focused attention on the training for both trainer as well as trainees.

(d) After completion of training due procedure shall be followed for obtaining the feedback from the participants on the effectiveness of the training. Effectiveness of training imparted shall be monitored for continual improvement and necessary corrections in implementation.

(e) The training/orientation program should be implemented to meet the mandatory r e q u i r e m e n t . [Rule 43(2) (m) of the Atomic Energy (Factories) Rules 1996]. The training should be phased as follows:

(f) Induction cum orientation training should include the overall safety aspects of the work and give a general overview of the various hazards, the particular activities and the do's and don'ts. As a part of training, workers should also be given demonstrations on use of personal protective equipment, first aid and fire-fighting equipment, fire mock drills, other emergency preparedness etc.

(g) The line manager along with the safety representative should conduct pre-job briefing on day-to-day basis prior to specific hazardous jobs. This will make the workers aware of the hazards and the precautions to be taken.

(h) Refresher training should be imparted to each worker at least once in a year.

(i) A training schedule should be prepared by the construction agency and communicated to facility for concurrence.

(j) Records of training, demonstration and pep talk should be maintained.

3.10 Permit to Work System

(a) Activities requiring permit to work shall be decided before starting the construction and shall be suitably documented in the project health and safety plan. Some of the activities which shall require permit to work are:

(i) Excavation
(ii) Entry into confined spaces
(iii) Electrical work (HV/LV)
(iv) Opening manholes, covers and grills
(v) Blasting operation
(vi) Hot work
(vii) Work on plant and machinery and other power driven equipment
(viii) Working at height
(ix) Working at night

(b) The contractor should establish a permit to work system for any other hazardous activity, which it feels necessary to be controlled administratively for safe execution.
(c) Contractor should obtain valid safety work permit before carrying out any hazardous job and shall maintain a copy of it with him throughout the period of his work. Record of safety work permit should be maintained in a systematic manner. All the safety conditions and
(d) Requirements stipulated in the safety work permit should be ensured strictly.
(e) Contractor should ensure that only authorized personnel are deployed for hazardous works/jobs and provide facilities for the same.

3.11 Job Hazard Analysis

(a) It should be ensured by contractor that a safe work procedure exists for all the hazardous jobs as mentioned hereunder and the requirements of the safety procedures are ensured at the work sites. Job hazard analysis (JHA) should form a part of such safe work procedures. A checklist based on JHA should be prepared. This checklist should be crosschecked by the line managers and verified by safety officer.

Typical list of jobs requiring job hazard analysis (This list is illustrative only and not exhaustive) is as follows:

(i) Excavation
(a) Blasting including under water blasting
(b) Earth and stone removal/backfilling/dumping of earth/ stones
(c) Any excavation more than 1.8 m depth.

(ii) Work at height (working beyond 3.5 meters above ground)
(a) Erection and dismantling of scaffolding, platforms, shuttering/de-shuttering work
(b) Dome work, rod bending, construction of chimney and cooling towers
(c) Working on tower crane.

(iii) Materials and material handling

(A) Critical equipment handling e.g.
(a) Calandria
(b) Steam generators
(c) Turbine generator components
(d) Diesel generator set
(e) Generator stator
(f) End shields
(g) Fuelling machines components
(h) Heat transport pumps etc.

(B) Hazardous chemical handling e.g.

(a) Acids and alkalis
(b) Ammonia
(c) Chlorine
(d) Freon
(e) Hydrazine
(f) Hydrogen sulphide
(g) LPG
(h) Morpholine

(C) Movement of heavy material by crane
(D) Movement of tractor trolley on slopes
(E) Manual lifting of heavy material to height
(F) Erection of heavy machinery, equipment.

(iv) Electrical connection
(a) Field connection for electrical installation
(b) Installation of lighting fixtures
(c) Charging of electrical system
(d) Charging of transformer, switch yard, switch gears
(e) Working near high voltage lines
(f) Use of portable electrical tools.

(v) Equipment/structural erection work
(a) Material handling
(b) Loading and unloading
(c) Transportation of material from one place to other
(d) Steel fabrication and erection
(e) Cleaning and maintenance of batching plant equipment.

(vi) Finishing/painting work
(a) Painting at height
(b) Painting in confined space.

(viii) Other specific work
(a) Work with pneumatic tools/compressed air
(b) Work on pressure vessels/lines
(c) Work in the vicinity of steam lines
(d) Work in high enthalpy area
(e) Work in high noise area
(f) Work in confined space including tunnels and trenches
(g) Work in isolated area (away from main site)
(h) Radiography work
(i) Work related to welding, gas cutting, grinding
(j) Working near conveyor, rotating machine
(k) Leak detection testing.

3.12 Reward

(a) To motivate the employees and organization to work safely measures can be implemented based on the suitability. Selection and rewarding for the following categories may be considered on regular basis:
(i) Safest workmen
(ii) Safest supervisor
(iii) Safest area
(iv) Safest sub-contractor, etc.
(v) Sub-contractors and employees may be rewarded when the project achieves significant million man-hours without any lost time injury.

4. WORK SPECIFIC SAFETY MEASURES
4.1 General

(a) The contractor should ensure that safety precautions are taken during the execution of awarded work and work areas are maintained safe at all times. At the end of each shift and at all times when the work is suspended, it should be ensured that the work area is left safe in such a way that no

materials and equipment that can cause damage to existing property, personal injury or interfere with the other works of the project or station are left in an unsafe manner.

(b) The contractor should ensure to provide and maintain all lights, guards, fencing, warning signs, caution boards and other safety measures and provide for vigilance as and when necessary for the

Protection of workers and for the safety of others. The caution boards should also have appropriate symbols.

(c) Adequate lighting facilities such as floodlights, hand lights and area lighting should be provided at the site of work, storage area of materials and equipment and temporary access roads within the working area.

(d) All works should be planned so as to avoid interference with other facilities, works of other contractors or sub-contractors at the site. In case of any interference, necessary coordination should be ensured for safe and smooth working.

(e) It should be ensured that the instructions given by the safety officer or his designated nominee regarding safety precautions, protective measures, housekeeping requirements, etc. are complied with. The safety officer with due intimation to line manager should have the right to stop the work, if in his opinion; proceeding with the work will lead to an unsafe and dangerous condition. Line manager should arrange to get the unsafe condition rectified and/or provide appropriate protective equipment.

(f) Contractor should ensure that each job with a hazard whether small or big is intimated to the Head, industrial safety of the facility well before it is taken up.

(g) The contractor should be fully responsible for non-compliance of any of the safety measures or requirements, implications, injuries, fatalities, dangerous occurrences and compensation arising out of such situations or incidents.

(h) Maximum duty hours of an individual should be as per the Factories Act 1948 or its latest amendment.

(i) Illumination levels should be as per the statutory requirements.

4.2 Excavation, Trenching and Earth Removal

(a) Before taking up excavation work, necessary permission should be obtained from the engineer-in-charge with reference to existing underground services.

(b) The Line manager of the works should exercise full care to ensure that no damage is caused by him or his workmen, during the operation/excavation etc., to the existing water supply, sewerages, and power or telecommunication lines or any other services or works. He should provide and erect before construction, substantial barricades, guardrails, and warning signs around the work area. He should also furnish, place and maintain adequate warning lights, display board, signals etc., as required.

(c) All trenches 1.2 m or more in depth should at all times be supplied with at least one ladder for every 30 m along the trench. Ladders shall extend from bottom of the trench to at least 1m above the surface of the ground.

(d) The sides of the trench/pit in soil, which are 1.2 m or more in depth should be stepped back to give suitable slope (angle of repose) or securely held by timber bracing or appropriate shoring/support, to avoid the danger of soil slides from collapsing. The excavated material should not be placed within 1.5 m or half of the depth of the pit whichever is more from edges of the trench/pit. Cutting should be done from top to bottom. Under no circumstances mining or undercutting should be done.

(e) Workers should not be exposed to the danger of being buried by excavated material or collapse of shoring. Measures to prevent dislodgment of loose or unstable earth, rock or other material from falling into the excavation by proper shoring shall be ensured.

(f) The stability and safety of the excavation, adjacent structures, services and other works should be ensured.

(g) All excavated area should be fenced off by suitable railing and installation of caution board to warn the persons from slipping or/ falling into the excavation pit/ mound.

(h) All excavated areas shall have an illumination level of at least 20 lux for night work and a red danger light shall be displayed at prominent place near the excavation site to warn approaching traffic and men.

(i) For removal of earth from an earth mound/excavated heap a written permission should be obtained from the engineer-in-charge of the work. As far as practical, earth should be removed mechanically. Wherever manual removal of earth is involved, earth should be removed from the top by maintaining a slope equal to the angle of re-pose of the earth. Such work should be constantly supervised to ensure that no under-cutting is done and to ensure that no person is trapped.

(j) Dumping of excavated soil should be done at a specified area under proper supervision with respect to signaling, illumination and safety clearance.

(k) It should be ensured that at a construction site of a building or other construction work, every vehicle or earth moving equipment is equipped with (a) silencers, (b) tail lights, (c) power and hand brakes, (d) reversing alarm (e) search light for forward and backward movement, which are required for the safe operation of such vehicle or earth moving equipment and (f) the cab of the vehicle or earth moving equipment is kept at least one meter from the adjacent face of a ground being excavated. (g) indicator etc.

(l) It should be ensured that when a crane or shovel is traveling, the boom of such crane or shovel is in the direction of such travel and the bucket or scoop attached to such crane or shovel is raised and without load, except when it is traveling downhill.

(m) Before loading or unloading power trucks or trailers attached to tractors, the brakes should be applied and if vehicle is on a sloping ground, the wheels should be blocked. Handcart should not be used for the transfer of construction/erection materials in the construction area. However if the exigency demands urgent transfer of light materials a small handcart may be permitted with the prior approval of the Engineer-in-charge.

(n) It should be ensured that at a construction site of a building or other construction work:

(i) All transport or earth moving equipment and vehicles are inspected at least once in a week by responsible persons and in case any defect is noticed in such equipment or vehicle, it is immediately taken out of service.

(ii) Safe gangways are provided for to and fro movement of building workers engaged in loading and unloading of lorries, trucks, trailers and wagons.

(iii) All earth moving equipment, vehicles or other transport equipment be operated only by such persons who are adequately trained and possess such skills as required for safe operation of vehicles or other transport equipment.

(iv) Trucks and other equipment are not loaded beyond their safe carrying capacity, which should be clearly marked on such trucks and other equipment.

(v) No unauthorized person rides the transport equipment employed in such work.

(o) It should be ensured at a construction site of a building or other construction work that:

(i) A shovel or an excavator whether operated by steam or electric or by internal combustion used for such work is constructed, installed, operated, tested and examined as required under any law for the time being in force and the relevant national standards.

(ii) Buckets or grabs of power shovels are propped to restrict the movement of such bucket or grabs while being repaired or while the teeth of such bucket or grabs are being changed.

(p) It should be ensured at a construction site of a building or other construction work that:

(i) An operator of a bulldozer before leaving - applies the brakes, lowers the blade and ripper and puts the shift lever into neutral.

(ii) A bulldozer is parked on level ground at the close of the work.

(iii) The blade of a bulldozer is kept low when such bulldozer is moving uphill.

(iv) Bulldozer blades are not used as brakes except in an emergency.

(q) It should be ensured at a construction site of a building or other construction work that:

(i) A tractor and a scraper are joined safely at the time of its operation

(ii) The scraper bowls are propped while blades of such scraper are being replaced.

(iii) A scraper moving downhill is driven in low gear.

(r) It should be ensured at a construction site of a building or other construction work that:

(i) Before a road roller is used on the ground, such ground is examined for its bearing capacity and general safety, especially at the edges of slopes such as embankments on such grounds.

(ii) A roller is not moved down hill with the engine out of gear.

(s) Vehicle carrying excavated material should have proper cover over the driver's cabin.

4.3 CONCRETING

Shuttering and supporting structures shall be of adequate strength and approved by Engineer-in-Charge. This shall be ensured before concrete is poured. The procedure approved by Engineer-in-Charge shall be followed for mixing, transporting and pouring of concrete

4.4 Safe Means of Access/Platforms

a) Adequate safe means of access and exit should be provided for all work places, at all elevations.

b) Suitable scaffolds should be provided for workmen for all works that cannot be done safely from the ground, or from solid platform except such short duration work that can be done safely from ladders. Bamboo/wooden scaffolding should not be permitted.

c) Where the platform for working is more than 3.5 m above ground, the width of the platform should be minimum 1 m.

d) Ladder should be of rigid construction having sufficient strength for the intended loads. Wooden/bamboo/rope ladders should not be permitted. All ladders should be maintained in good condition. The ladders should be fixed to the ground or rigid platforms. An additional person should be engaged for holding the ladder, if ladder is not securely fixed. Ladder shall be extended from floor to at least one meter above the platform.

e) A portable ladder should be given an inclination not steeper than 1in 4 (1 horizontal and 4 vertical). Ladders should not be used for climbing while carrying materials in hands. While climbing both the hands should be free.

f) Any working platform on scaffolding or staging more than 3.5 m above the ground or floor should have a guard rail attached, bolted, braced at least 1.0 m high above the floor or platform of such scaffolding or staging along with mid-rail.

g) The planks used for any working platform should not project beyond the end supports to a distance exceeding four times the thickness of the planks used. The planks should be rigidly fixed at both ends to prevent sliding, slipping or tilting. The thickness of the planks should be adequate to take load of men and materials and should not collapse. Plywood or packing wood should not be used as planks.

h) The guardrail should extend along the entire exposed length of the scaffolding with only such opening as may be necessary for the delivery of materials. Standard railing should have posts not more than 2 m apart and an intermediate rail halfway between the floor or platform of the scaffolding and the top rail. Such scaffolding or staging should be so fastened as to prevent it from swaying from the building or structure. Scaffolding and ladder should conform to IS 3696 (Part I): 1987 and (Part II): 1996.

i) Working platforms of scaffolds should have toe boards at least 15 cm in height to prevent materials from falling down.

j) A sketch of the scaffolding proposed to be used should be prepared and approval by the engineer-in-charge obtained prior to start of erection of scaffolding. All scaffolds should be examined by engineer-in-charge before use.

k) Working platform, gangways and stairways should be so constructed that they should not sag unduly or unequally and if the height of the platform or gangway or stairway is more than 3.5 m above ground level or floor level, they should have adequate width for easy movement of persons and materials and should be suitably guarded.

l) No single portable ladder should be used for access to a height of more than 4.5 m. For ladders up to 3m in length the width between styles (side bars)/width in the ladder should in no case be less than 300

mm. For longer ladders this width should be increased by at least 20 mm for each additional meter of length. Step/rungs spacing should be uniform and should not exceed 300 mm. Portable ladder should be used only for access to work place. In case work place is higher than 4.5 meters, pre-fabricated steel staircase should be used.

4.5 Work at Height

a) Person to work at height should be medically fit and should have height pass issued by safety section. (Appendix-D Part A, B and C). Safety training should be imparted before working at height.

b) Safety work-permit system for working at height should be obtained from industrial safety section.

c) At elevated places, secure access and foothold should be provided. Adequate and safe means of access and exit should be provided at all work places for all elevations. Means of access may be portable or fixed ladder, ramp or a stairway. The use of crosses, braces or framework, as a means of access to the working platform should not be permitted.

d) Linear movement at height should be reduced to minimum. In case of such movement provision for anchoring the safety belt should be made.

e) Where barricades cannot be installed, a safety net of adequate strength should be installed close to the level at which there is a danger of fall of personnel/fall of objects.

f) In case where 'work at height' is on asbestos roof, crawling board/ roof ladder should be used to walk across the asbestos roof.

4.6 WORK IN RADIATION AREA

The contractor shall follow the stipulated procedure regarding work in the radiation area and other works related with radiography

4.7 Electrical Safety

a) All electrical installations shall comply with the appropriate statutory requirements given below and shall be subject to approval of the Electrical Engineer and Safety Officer.
   (i) The Electricity Act, 2003
   (ii) The Indian Electricity Rules 1956 (as amended in 2000)
   (iii) The National Electricity Code 2008
   (iv) Atomic Energy (Factories) Rules, 1996
   (v) Other relevant rules of Statutory Bodies and power supply authority
   (vi) Relevant standards of BIS

   In addition to the above statutory provisions, the clauses indicated in this document shall also be complied.

b) It shall be the responsibility of the user seeking temporary power supply to indicate in writing, if any of the clauses (requirements noted in above regulations and in this document) are conflicting with each other and for which the user cannot decide the course of action regarding safe installation, commissioning, operation, maintenance and decommissioning of the electrical installations.

c) The electrical engineer and safety officer of the agency providing temporary power supply shall interpret the concerned conflicting clauses and approve in writing the safe course of action.

d) The application Form-1 (Form-1A, 1B and 1C) as mentioned in Appendix-E should be submitted by the user for getting the temporary power supply.

e) After installation of temporary electrical panels, wiring works by the user, Certificates as per Form-1D (Appendix-E) should be submitted to the provider.

f) Certificate of safety officer and authorization of electrical engineer for energisation of temporary power supply should be filled as per Form-1E (Appendix-E).

GUIDELINES AND GENERAL PROCEDURES FOR SUPPLY AND USE OF ELECTRICITY AT SITE 4.7.1. GENERAL

Following safety requirements shall be complied with before the contractor uses the power supply.

4.7.1.1 The Contractor shall submit a list of licensed electrical staff to be posted at site.

4.7.1.2 It shall be the responsibility of the Contractor to provide and maintain complete installation on the load side of the supply point with regard to the safety requirements at site. All cabling and installation shall comply with the appropriate statutory requirements given below and shall be subject to approval of the Departmental Engineer-in-charge/Electrical Engineer.

a) Indian Electricity Act, 1910.
b) Electricity (Supply) Act, 1948.
c) Indian Electricity Rules, 1956.
d) National Electric Code, 1985.
e) Other relevant rules of Local Bodies and Electricity Boards.

The power supply shall be regulated as per the terms and conditions of the supply of the respective electricity boards.

4.7.1.3 (a) The electric power supply will be made available at only one point in the works site of the Contractor by the department. An electrical panel shall be provided at the site by the contractor. The incomer of the panel shall consist of an Energy Meter with class - 1 accuracy.

(b) Where distribution boards are located at different places the Contractor shall submit schematic drawing indicating all details like size of wires, Over Head or cable feeders, earthing etc., The position and location of all equipments and switches shall be given.

4.7.1.4 The Contractor shall make his own arrangements for main earth electrode and tapings thereof. The existing earth points available at site can be used at the discretion of the Departmental Electrical Engineer with prior permission. Method of earthing, installation and earth testing results shall conform to relevant I.S. Specifications (IS-3043).

4.7.1.5 All three phase equipment shall be provided with double earthing. All light fixtures and portable equipment shall be effectively earthed to main earthing.

4.7.1.6 All earth terminals shall be visible. No gas pipes and water pipes shall be used for earth connection. Neutral conductor shall not be treated as earth wire.

4.7.1.7 The Contractor shall not connect any additional load without prior permission of Departmental Electrical Engineer. For obtaining additional power required, test reports of the tests mentioned in (d) of Form SGCW-1 shall be submitted.

4.7.1.8 Joints in earthing conductors shall be avoided. Loop earthing of equipment shall not be allowed. However tapings from an earth bus may be done.

4.7.1.9 The entire installation shall be subjected to the following tests before energisation of installation including portable equipment.

a) Insulation resistance test.
b) Polarity test of switches.
c) Earth continuity test.
d) Earth electrode resistance.

The test procedures and their results shall conform to relevant IS Specifications. The contractor shall submit a test report for his complete installation every 2 months or after rectifying any faulty section in the specimen test report. One such test report for the complete installation shall be submitted before onset of monsoon.

4.7.2. The following are provided for general guidance of the Contractor and shall be read as specific requirement, in addition to complying with Indian Electricity Act, Indian Electricity Rules and IS Specifications.

4.7.2.1 Installation

a) Only persons having valid wireman's license/competency certificate shall be employed for carrying out electrical work and repair of electrical equipment, installation and maintenance at site. The job shall be supervised by a qualified licensed Supervisor.

b) Electrical equipment and installations shall be installed and maintained as to prevent danger from contact with live conductors and to prevent fires originating from electrical causes like short circuits, overheating etc. Installation shall not cause any hindrance to movement of men and materials.

c) Materials for all electrical equipment shall be selected with regard to working voltage, load and working environment. Such equipment shall conform to the relevant standards.

d) The minimum clearance to be maintained for all overhead lines along roads and across roads shall be as per the statutory requirements as listed in clause 1.2 of Annexure.

e) Grounding conductor of wiring system shall be of copper or other corrosion resistant material. An extra grounding connection shall be made in appliances equipment where chances of electric shock are high.

f) Electric fuses and/or circuit breakers installed in equipment circuits for short circuit protection shall be of proper rating. It is also recommended that high rupturing capacity (HRC) fuses be used in all circuits. For load of 5 KW or more earth leakage circuit breaker shall be provided in the circuits.

g) Wherever cables or wires are laid on poles, a guard wire of adequate size shall be run along the cables/wires and earthed effectively. Metallic poles as a general rule shall be avoided and if used shall be earthed individually. Anti climbing guards and danger notices shall be provided on poles. Each equipment shall have individual isolating switches.

h) Wires and cables shall be properly supported and an approved method of fixing shall be adopted. Loose hanging of wires & cables shall be avoided. Lighting and power circuits shall be kept distinct and separate.

i) Reinforcement rods or any metallic part of structure shall not be used for supporting wires and cables, fixtures, equipment, earthing etc.

j) All cables and wires shall be adequately protected mechanically against damages. In case the cable is required to be laid underground, it shall be adequately protected by covering the same with bricks. Plain cement Concrete (PCC) tile or any other approved means.

k) All armored cables shall be properly terminated by using suitable cable glands. Multistranded conductor cables shall be connected by using cable lugs/sockets. Cable lugs shall preferably be crimped. They shall be of proper size and shall correspond to the current rating and size of the cable. Twisted connections will not be allowed.

l) All cable glands, armoring and sheathing of electric cables, metal circuits and their fittings, metallic fittings and other non-current carrying parts of electrical equipment and apparatus shall be effectively grounded.

m) All the Distribution Boards, Switch Fuse units, Bus bar chambers, ducts, cubicles etc. shall have MS enclosures and shall be dust, vermin and water proof. The Distribution Boards, switches etc. shall be so fixed that they shall be easily accessible. Changes shall be done only after the approval of the Departmental Electrical Engineer.

n) The contractor shall provide proper enclosures/covers of approved size and shape for protection of all the switch board, equipment etc. against rain. Exposed live parts of all electrical circuits & equipment shall be enclosed permanently. Crane trolley wires and other conductors which cannot be completely insulated shall be placed such that they are inaccessible under normal working conditions.

o) Iron clad industrial type plug outlets are preferred for additional safety.

p) Open type Distribution Boards shall be placed only in dry and ventilated rooms; they shall not be placed in the vicinity of storage batteries or otherwise exposed to chemical fumes.

q) Isolating switches shall be provided close to equipment for easy disconnection of electrical equipment or conductors from the source of supply when repair or maintenance work has to be done on them.

r) In front of distribution boards a clear space of 90 cm shall be maintained in order to have easy access during an emergency.

s) Adequate working space shall be provided around electrical equipment which require adjustment or examination during operation.

t) As far as possible electrical switches shall be excluded from a place where there is danger of explosion. All electrical equipment such as motors, switches and lighting fittings installed in work room where there is possibility of explosion hazard shall be explosion proof.

u) All connections to lighting fixtures, starters or other power supplies shall be provided with PVC insulated, PVC sheathed twin/three/four core wires to have better mechanical protection for preventing possible damage to equipment or injury to personnel. Taped joints shall not be allowed and the connections may be made in looping system. Electric starter of motors, Switches shall not be mounted on wooden boards. Only sheet steel mounting or iron frame work shall be used.

v) All the lighting fixtures and lamp holders shall be of good quality and in good condition. Badly repaired or broken holders, etc. shall not be used.

w) Only PVC insulated and PVC sheathed wires or armoured PVC insulated and sheathed cables shall be used for external power supply connections of temporary nature. Weather proof rubber wires shall not be used for any temporary power supply connections. Taped joints in the wires shall not be used.

x) The bulbs/lamps used for illumination and testing purpose shall have cover or guard to protect them from accidental breakages. Only 24 V supply system shall be used for hand lamps etc, while working inside metallic tanks or conducting vessels.

y) After installation of new electric system and or other extensive alterations to existing installations, thorough inspection shall be made by Departmental Electrical Engineer before the new system or new extension is put in use.

z) Contractor shall ensure that power factor for their loads shall be maintained at 0.85. In case the power factor falls below 0.85, necessary capacitor units shall be provided by the contractor.

4.7.2.2 Operation & Maintenance

a) All persons who work with electrical installation/equipment shall be aware of the electrical hazards, use of protective devices and safe operational procedures. They shall be given training in fire fighting, first aid and artificial resuscitation techniques.

b) The supervisor shall instruct the proper procedure, specify and enforce the use\ of necessary protective equipment such as adequately insulated pliers, screw drivers, fuse pullers, testing lamps and similar hand tools. Only wooden ladders shall be used to reach the heights in electrical work.

c) No material or earth work shall be allowed to be dumped below or in the vicinity of the bare overhead line conductors.

d) Separate work permits shall be issued for individual group leaders working on the same system which shall be returned after the completion of the work to Safety Supervisor and no system shall be energized without the clearance of Safety supervisor.

e) Necessary isolation shall be obtained following the prevailing departmental rules before working on live lines. While working with live electrical systems electrical safety is of paramount importance and all the rules as laid down in this document shall be followed scrupulously. No work to be done any live system and necessary isolation shall be done in consultation with Engineer-in-Charge before opening any live enclosure. Before any maintenance work is commenced on electrical installations/equipment, the circuits shall be de-energized and ascertained to be dead by positive test with an approved voltage testing device. Switches shall be tagged or the fuse holders withdrawn before starting the work.

Adequate precautions shall be taken in two important aspects viz.

i) That there shall be no danger from any adjacent live parts and

ii) That there shall be no chances of re-energisation of the equipment on which the persons are working

f) While working on or near a circuit, whenever possible the use of one hand may be practiced even though the circuit is supposed to be dead. The other hand may preferably be kept in pocket.

g) When it is necessary to touch electrical equipment (for example when checking for overload of motors) back of the hand may be used. Thus, if accidental shock were to cause muscular contractions one would not 'freeze' to the conductor.

h) Operation of electrical equipment shall be avoided when standing on wet floor or when hands are wet.

i) Before blown fuses are replaced, the circuit shall be locked out and an investigation shall be made for the cause of the short circuit or overload.

j) When two persons are working within reach of each other, they shall never work on different phases of the supply.

k) When structural repairs, modification or painting work are to be undertaken, appropriate measures shall be taken for the protection of persons whose work may bring them into the proximity of live equipment/circuit.

l) It shall be ensured that the insulation and wire size of extension cords are adequate for the voltage and current to be carried.

m) While tapping electricity from the socket, plug top must be used. It shall be ensured that no extension boards are over loaded while tapping. Only standard three pin plugs shall be used for tapping electricity. Broken sockets/plugs shall be replaced immediately with good ones. Only joint free cables shall be used for connecting equipment/apparatus.

n) Floors shall be kept free from trailing electrical cables to avoid tripping hazard.

o) Power supply to all the machines and lighting fixture shall be switched off when not in use.

p) Temporary electrical connections shall be removed as soon as the stipulated work is over. After completion of the works, the contractor shall dismantle the distribution boards and the other facilities he may have erected.

q) Unauthorized tapping of power by others from distribution boards under the control of the contractor shall be prohibited at all circumstances.

r) No flammable materials shall be stored in any working area near the switch boards.

s) Safety work permits shall be used for switching off the main feeder and equipment by the contractor.

t) "MEN ON LINE" " DO NOT SWITCH ON" "DANGER" or "CAUTION" board as applicable shall be used during maintenance works on the electrical equipment.

4.7.2.3 Portable electrical equipment

a) Portable electrical equipment shall be regularly examined, tested and maintained to ensure that the equipment and its leads are in good order. Register shall be maintained for inspection recording, the testing dates and results of the equipments.

b) All portable appliances shall be provided with three core cable and three pin plug. The third pin of the plug shall invariably be earthed. It shall be ensured that the metal part of the equipment shall be effectively earthed.

c) All connections to portable equipment or machines from the panel/distribution board/extension board shall be taken using 3 core double insulated PVC flexible copper wire in one length. No joints shall be allowed in this flexible wire. In case single length of wire is not sufficient for a particular location then the supply can be tapped by providing another extension board comprising of switch and socket.

d) Flexible cables for portable lamps, tools and apparatus shall be regularly examined, tested periodically and maintained to ensure safety.

4.8 Material Handling and Lifting Machines and Tackles

a) It should be made compulsory to supervise jobs like lifting/placing/loading/unloading/carrying/ transporting etc. of heavy material by qualified supervisor having knowledge about hazards involved and precautions to be taken for such job.

b) The line managers should ensure that the material handling equipment used is adequate to handle the load.

c) Manual pulling of heavy equipment and trolley loaded with heavy material is not to be permitted.

d) Stacking and handling of heavy materials should be done on a firm ground to prevent settlement.

e) No lifting machine and no chain, rope or lifting tackle, except a fiber rope or fiber rope sling, shall be taken into use for the first time in that factory unless it has been tested and all parts have been thoroughly examined by a competent person. A certificate of such a test and examination specifying the safe working load or loads and signed by the person making the test and the examination has been obtained and is kept available for inspection.

f) Use of lifting machines and tackles should conform to relevant BIS requirements [IS 13367 (Part 1): 1992 Reaffirmed 2003, IS 4573: 1982 (Reaffirmed 2000) and IS 13834 (Part 1): 1994 Reaffirmed 2003 etc. The accessories and the attachments, anchorages and supports etc. should be ensured in healthy conditions by regular inspections at defined frequencies.

g) Every rope used in hoisting or lowering materials or as a means of suspension should be of good quality and adequate strength and free from any defect. This should be ensured by regular inspection as per IS 2762: 1982- Specification for wire rope slings and sling legs (first revision).

h) Every crane operator or lifting appliance operator should be authorized. No person under the age of 18 years should be in charge of any hoisting machine or give signal to an operator of such machine.

i) In case of every lifting machine (and of every chain, ring, hook, shackle, swivel and pulley block used in hoisting or as a means of suspension) the safe working load should be ascertained and clearly marked. In case of a lifting machine having a variable safe working load, each safe working load and the conditions under which it is applicable should be clearly indicated. No part of any machine should be loaded beyond the safe working load except for the purpose of testing. This should be approved by the engineer-in-charge and Head, Industrial Safety.

j) In case of facilities machines, the safety of the machines shall be ensured by the Engineer-in-charge. As regards the Contractor's machines, the contractor should declare the safety of the machine to the Engineer-in-charge whenever he brings any machinery to site of work and get it verified by the engineer-in-charge, supported by a valid test certificate by the competent person.

k) Thorough inspection and load testing of lifting machines and tackles should be done in the presence of competent person at least once in every 12 months and records of such inspections and testing should be maintained.

l) No mobile crane should be allowed to move under live high-tension power transmission line.

m) While lifting loads, cranes should be located on level ground.

n) A thorough load analysis should be carried out before using cranes in tandem.

o) Motors, gear transmission, couplings, belts, chain drives and other moving parts of hoisting appliances should be provided with adequate safeguards. Hoisting appliances should be provided with such means, which will reduce the risk of any part of a suspended load becoming accidentally displaced or lowered.

(i) It should be ensured that the cabin of the lifting machine in outdoor service:
(ii) Is made of fire resistant material,
(iii) Has a suitable seat, a footrest and protection from vibration,
(iv) Affords the operator an adequate view of the area of operation,
(v) Affords the operator adequate protection against the weather, and is provided with fire extinguisher.

4.9 Welding and Gas Cutting

a) Welding and gas cutting operations should be done by qualified and authorized persons only.

b) Safety work permit shall be obtained (wherever necessary like presence of flammable or combustible material etc.) before flame cutting/welding is taken up.

c) Welding and gas cutting should not be carried out in places where flammable or combustible materials are kept and where there is danger of explosion due to presence of gaseous mixtures. In case the requirement cannot be avoided, specific approval and procedure should be ensured and adequate precautions should be taken.

d) Welding and gas cutting equipment including hoses and cables should be maintained in good condition.

e) Barriers should be erected to protect other persons from harmful rays from the work. When welding or gas cutting is done in elevated positions, precautions should be taken to prevent sparks or hot metal falling below on persons or combustible materials.

f) Suitable type of protective clothing consisting of fire resistant gauntlet gloves, leggings, boots and aprons should be provided to workers as protection from heat and hot metal splashes. Face shields with filter glasses of appropriate shade should be worn.

g) Adequate ventilation should be provided while welding, brazing and cutting the metals like zinc, brass, bronze, galvanised or lead coated material.

h) Welding and gas cutting on drums, barrels, tanks or other containers should be taken up only after ascertaining that they have been emptied, cleaned thoroughly and made free of flammable material.

i) Fire safety measures should be available as required near the location of welding/cutting operations.

j) Flash back arrestor should be provided with gas cutting and gas welding sets.

k) For electric (Arc) welding the following additional safety precautions should be taken:

(i) When electrical welding is undertaken the return lead of welding machine should be directly connected to the job invariably.

(ii) Provision must be in place in electric welding machine to prevent physical contact with live parts.

(iii) The welding cables and power cables should be routed separately to avoid entanglement.

(iv) The electric welding set should have suitable earth connections. There should be an electrical isolation device in the input power supply side on the welding machine.

l) Double gauges should be used for all gas cylinders used for cutting/ welding. Pressure gauges/regulators should be in healthy condition.

4.10 Rotary Cutters/Grinders

a) All portable cutter/grinders should be provided with the wheel guard in position.

b) Grinding wheels of specified diameter only should be used on all grinders in order to limit the prescribed peripheral speed.

c) In pedestal grinder, the gap between tool rest and grinding wheel should be maintained less than 3 mm.

d) Goggle/face shield should be used during grinding operation.

e) No grinding wheel should be used after its expiry date.

f) Ear muff/ear plug should be used during the welding /cutting jobs.

g) Portable appliances, which are powered by single phase AC supply, shall be provided with three-core cable and three pin plug, otherwise the whole body should be double insulated.

h) Safety work permit should be obtained (wherever necessary like presence of flammable or combustible material etc.) before grinding is taken up.

i) Fire safety measures should be available as required near the location of grinding operations.

4.11 Painting

(a) Appropriate breathing air respirators should be provided for use by the workers when paint is applied in the form of spray, or a surface having lead paint is dry rubbed or scraped.

(b) Only the quantity of paint, thinner and polish required for the day's work should be kept at the work spot. Excess storage should not be permitted at the work spot.

(c) Smoking, open flames or sources of ignition should not be allowed in places where paints, varnish, thinner and other flammable substances are stored, mixed or used. A caution board, with the instructions written in national language and regional language, 'SMOKING - STRICTLY PROHIBITED' should be displayed in the vicinity where painting is in progress or where paints are stored. Symbols should also be used on caution boards.

(d) All electrical equipment of paint storage room should be of explosion proof design. Suitable fire extinguishers / sand buckets should be kept available at places where flammable paints are stored, handled or used.

(e) When painting work/hot resin mix is done in a closed room or in a confined space, adequate ventilation should be provided and ensured. In addition, suitable respirators should be provided. No portable electric light or any other electric appliance of voltage exceeding 24 volts should be permitted for use inside any confined space. Walkietalkie or other means of communication should be provided. Rescue arrangement like full body harness with lifeline, tripod with pulley and extra BA sets should be available.

(f) The workers should use PVC gloves and/or suitable barrier creams to prevent the skin contact with Epoxy resins and their formulations used for painting.

4.12 Demolition

(a) Before any demolition work is commenced and also during the progress of the work, all roads and open area adjacent to the work site should either be closed or suitably cordoned. Appropriate warning signs should be displayed for cautioning approaching persons/ vehicles.

(b) Before demolition operations begin, it should be ensured that all the service lines are de-energized.

(c) Persons handling demolition operations shall use appropriate PPE.

(d) All demolition operations should be carried out with safe and duly approved procedures which shall include following but not limited to:

(i) No masonry/material should be permitted to fall in such masses or volume or weight so as to endanger the structural stability of any floor or structural support.

(ii) No wall, chimney or other structure or part of a structure is left unguarded in such a condition that it may fall, collapse or weaken due to wind pressure or vibration.

(iii) No floor roof or other part of the building should be overloaded with debris or materials as to render it unsafe.

(e) After the demolition, the debris and other materials collected should be disposed safely and not permitted to be dropped freely.

(f) Entries to the demolition area shall be restricted to authorized persons wearing safety helmets and safety shoes.

4.13 Traffic

(a) All the vehicles moving at sites should conform and comply with the requirements of Motor Vehicles Act, 1988 and the Rules made thereunder. All the drivers /operators of vehicles should possess valid driving license as per Motor Vehicles Act, 1988 or its latest amendment.

(b) When the construction work causes interference with traffic such as road cutting or transit unloading of heavy equipment etc. notice of such interference should be given to the engineer-in-charge and Head, industrial safety well in advance with the details of start of the work and time required.

(c) A cleaner/assistant must be available for all heavy vehicles whenever vehicles move forward as well as in the reverse direction. All vehicles should be fitted with proper reverse horns, back view mirrors and indicator signals.

(d) Facility shall ensure that the assessment of the driver's visual ability is carried out as per Rule 55 of the Atomic Energy (Factories) Rules, 1996/guidelines of advisory committee on occupational health (ACOH), AERB or as per the latest amendments in statutes.

(e) Effective speed breakers with yellow stripes on the roads to regulate the speed at the vulnerable points should be installed. Effective barricading with adequate caution signs should be placed to warn the vehicle drivers whenever the jobs are carried out on the road.

(f) All vehicles moving at the site should have roadworthiness certificate issued by the concerned authority.

(g) Special limit boards and caution boards indicating turns should be installed wherever necessary.

(h) In general, the following maximum speed limits should be specified and implemented. Vehicles speed limits should be as per Motor Vehicle Act or 20 Km/h. Extra precautions and care should be exercised particularly during heavy material/equipment movements.

(i) Safety awareness programs should be conducted for all the drivers of the light, medium and heavy vehicles.

4.14 Work in and Around Water Bodies

(a) When work is done at a place where there is risk of drowning, all necessary rescue equipment such as life buoys and life jackets should be provided and kept ready for use.

(b) All necessary steps shall be taken for prompt rescue of any person in danger and adequate provision should be made for prompt first-aid treatment of all injuries likely to be sustained during the course of the work. Proper record of entry/exit to and from water bodies shall be maintained on shift basis and search operation shall be conducted as soon as any person is detected to be missing.

(c) Caisson Work

(i) Safe means of access should be provided to the place of work in the caisson and adequate means should be provided to safely reach the top of caisson in the event of inrush of water.

(ii) The work relating to construction, positioning, modification or dismantling of caisson shall be done under the supervision of a responsible person.

4.15 Fire Safety

(a) Provisions prescribed in the AERB safety standard on 'Fire Protection Systems for Nuclear Facilities', [AERB/NF/SS/FPS (Rev. 1)] shall be complied.

(b) All necessary precautions should be taken to prevent outbreak of fires at the construction site. It should be ensured that all hot works are carried out under valid work permit.

(c) Combustible materials such as wood, cotton waste, oil, coal, paints, chemicals etc., should be segregated and kept to the required bare minimum quantity at work place.

(d) Containers of paints, thinners and allied materials should be stored in a separate room which should be well ventilated and free from excessive heat, sparks, flame or direct rays of the sun. The containers of paint should be kept covered or properly fitted with lid and should not be kept open except while using.

(e) Adequate number of trained persons from approved fire training centre required to extend fire safety coverage should be ensured.

(f) Fire extinguishers as approved by the engineer-in-charge/in-charge of fire station/safety in-charge should be located at the construction site at appropriate places.

(g) Adequate number of trained workmen in fire fighting who can operate fire extinguishers should be ensured.

(h) Portable fire extinguishers with periodic inspection, maintenance and re-filling complying with the mandatory requirements should be ensured.

(i) Availability of adequate water for firefighting should be ensured.

(j) Implementation of the provisions of various statutory licenses for storing gas cylinders, petroleum products, explosives etc. as per the relevant Acts and Rules should be ensured wherever required.

4.16 Environmental Safety

Relevant provisions of the state/central statutory authority regarding environment protection should be adhered to.

4.17 Public Protection

The Contractor should make necessary provisions to protect the public. He should be bound to bear the expenses in defense of every action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of any precaution required to be taken to protect the public. He should pay for the any such damage and cost which may be awarded in any such suit, action or proceedings to any such person, or the amount, which may be fixed as a compromise by any such person.

4.18 Safety of Visitors

(a) Visitors for the project shall be given health and safety induction before they are allowed in to the construction project. It shall include the minimum PPE to be used, hazards and risks at the work area, restricted areas of entry, emergency response arrangements, etc.

(b) Visitors shall always be accompanied by one of the employees of the project site.

(c) Visitors shall not be allowed in the hazardous areas unless they are competent and trained to work in such areas.

4.19 Housekeeping

(a) It should be recognized that a proper place for everything and everything in its place is maintained for a good housekeeping.

(b) The material required for immediate use only should be brought to the designated workplace and stacked properly and labeled suitably.

(c) All work spots, site office and surroundings should all times be kept clean and free from debris, scrap, concrete muck, surplus materials and unwanted tools and equipment. A day-to-day collection and

disposal of scraps/debris should be done safely at designated place.

(d) Electrical cables should be so routed as to allow safe traffic by all concerned. Cable should be preferably supported on the brackets fixed along the wall to maintain safe access. Wherever routing on the floor cannot be avoided, care should be taken to ensure mechanical protection of these cables and safe access is not disturbed.

(e) No material at any work place should be so stacked or placed or disposed off as to cause danger, inconvenience or damage to any person or environment.

(f) All unused scaffoldings, surplus/scrap materials and equipment/systems like temporary electrical panels etc. should not be allowed to accumulate and shall be removed from the premises at the earliest.

(g) Accumulation of water /oil spillages on the floor or any other workplace should be avoided.

(h) Proper aisle space marking should be provided in all workplaces.

4.20 Other Statutory Provisions

Notwithstanding the clauses in the above subsections, there is nothing in these clauses to exempt the contractor from the provisions of any other Act or Rules in force in the Republic of India. In particular, all operations involving the transport, handling, storage and use of explosives should be as per the standing instructions and conform to the Indian Explosives Act, 1884 and the Explosives Rules, 1983. Handling, transport, storage and use of compressed gas cylinders and pressure vessels should conform to the Gas Cylinder Rules 2004 and Static and Mobile Pressure Vessels (Unfired) Rules 1981. In addition, The Indian Electricity Act 2003 and Indian Electricity

Rules 2005, the Atomic Energy Act, 1962, the Radiation Protection Rules, 2004, the Atomic Energy (Factories) Rules, 1996 and AERB safety manual on 'Radiation Protection for Nuclear Facilities' [AERB/NF/SM/O-2 (Rev.4)] should be complied with.

5. PERSONAL PROTECTIVE EQUIPMENT

5.1 General

Although the primary approach in any safety effort is that the hazard to the workmen should be eliminated or controlled by engineering methods rather than protecting the workman through use of personal protective equipment (PPE). Engineering methods could include design change, substitution, ventilation, mechanical handling, atomization etc. Under those situations when it is not possible to introduce any effective engineering methods for controlling hazards, it is necessary that workman use appropriate type of PPE. For example, in construction work there is the possibility of a hand tool, a bolt, or some loose material to fall from an elevated level and striking the head of workman working below. It is therefore necessary that construction worker wear a safety helmet. It is for such situations, both the Factories Act 1948 and the Atomic Energy (Factories) Rules, 1996 have provisions for use of appropriate type of PPE. It is thus recognized that use of PPE is an important and necessary consideration in the development of a safety program. Once the safety professional decides that PPE is to be used by workmen, it is essential to select right type of PPE and construction agency should ensure that workman uses it and also PPE is correctly maintained.

5.2 Personal Protective Equipment (PPE)

(a) All personal protective equipment as considered necessary should be made available for the use of the persons employed on the site and maintained in a condition suitable for immediate use. Also adequate steps should be taken by line manager to ensure proper use of PPE.

(b) All the PPEs in use should be as per relevant IS standards as referred in the AERB safety guidelines on 'Personal Protective Equipment' (AERB/SG/IS-3).

(c) All persons employed at the construction site should use safety helmets. Safety helmet should be with BIS mark and should have its headband with back support and chin strap.

(d) Workers employed on mixing asphaltic materials, cement and lime mortars should use protective goggles, protective foot wears, hand gloves and respirators as required.

(e) Persons engaged in welding and gas-cutting works should use suitable welding face shields. The persons who assist the welders should use suitable goggles. Protective goggles should be worn while chipping and grinding.

(f) Stonebreakers should use protective goggles. They should be seated at sufficiently safe distances from one another.

(g) Safety goggles should be of shatterproof type and with zero power.

(h) Persons engaged in or assisting in shot blasting operations and cleaning the blasting chamber should use suitable gauntlets, overalls, shatterproof and dust-proof goggles and self contained breathing apparatus set.

(i) All persons working at heights more than 3.5 m above ground or floor and exposed to risk of falling down should use full body harness safety belts, unless otherwise protected by cages, guard railings, etc. In

places where the use of safety belts is not feasible, suitable net of adequate strength fastened to substantial supports should be used.

(j) When workers are employed in sewers and inside manholes that are in use, it should be ensured that the manholes are opened and are adequately ventilated at least for an hour. After it has been well ventilated, the atmosphere inside the space should be checked for the presence of any toxic gas or oxygen deficiency by a competent person and recorded in the register before the workers are allowed to get into the manholes. A pilot team should enter the area donning self contained breathing apparatus (SCBA). The manholes opened should be cordoned off with suitable railing and provided with warning signals or caution boards to prevent accidents. There should be proper illumination in the night. Depending upon the work situation, the contractor should provide PPE including the SCBA as recommended by Head, industrial safety.

6. MEDICAL MANAGEMENT

6.1 General

(a) The contractor shall make arrangements for the first aid and medical services for the injured or ill persons for prompt attention or aid.

(b) The arrangement can be made by the contractor or an agreement can be in vogue with the facility.

(c) The medical facilities at first-aid centre shall be adequate to immediately cater to the injured based on the hazard potential and probable severe injuries.

(d) The first-aid centre shall be provided with the adequate equipment and medicines for catering to the site requirements. The first-aid centre shall be manned depending on the working hours / on round the clock shift basis. The services of at least one qualified medical practitioner (medical officer) shall be made available by the contractor.

6.2 Medical Facilities

(a) Medical facilities conforming to the provisions of the Atomic Energy (Factories) Rules, 1996 should be provided at all work sites.

(b) The requisite medical facilities in the form of a well-equipped first aid centre manned by qualified nursing personnel should be provided at all work sites. Contractor may avail this facility as per terms and conditions of the contract.

(c) In addition, well-maintained first-aid boxes should be kept at each location of the work by the contractor and availability of the personnel trained in first aid should be ensured.

(d) A manned and equipped ambulance should be available at work site during the working hours/on round-the-clock shift basis.

(e) It should be ensured by the facility that occupational health monitoring of contract workers is carried out as per provisions of the Factories Act 1948 as per the latest amendment and the stipulations/directives given by Atomic Energy Regulatory Board from time to time.

(f) Display of emergency contact numbers of important persons and hospitals and route map of site shall be maintained at designated places.

6.3 Medical Management of Serious Injuries

(a) In case of serious injuries, the injured should be shifted to the nearest first-aid centre at site immediately. The opinion of medical officer/certifying surgeon should be sought immediately for medical management.

(b) After providing the first aid treatment the injured should be shifted to designated medical facility of the site/hospital for further medical assistance, in an ambulance along with a nursing attendant.

(c) The doctor at the medical facility of the site/hospital attending the case shall assess the extent of injuries and render immediate medical aid. If the situation warrants trauma/special care the injured shall be shifted to the referral hospital, having all the requisite facilities for specialized treatment in ambulance along with a medical attendant.

(d) A list of such referral hospitals for specialised medical management facilities for the injured persons should be available with the project management/Head, industrial safety and Head, medical services of the site for ready reference.

7. REPORTING OF ACCIDENT

7.1 All accidents leading to property damage and/or personnel injuries shall be reported to the Engineer-in-charge immediately who shall inform SARCOP to be followed up with detailed accident reports in prescribed form.

7.2 Contractor shall also submit a monthly statement of accidents to Engineer-in-charge by 4th of every month showing details of accident, nature of injury including disability, days lost, treatment required, etc., and the extent of property damage.

APPENDIX-D

APPLICATION FOR HEIGHT PASS

PART- A

Group/Section: _____

Agency: _____

1. Applicant's name :
2. Facility address :
3. Residential address :
4. Age :
5. Sex :
6. Height :
7. Gate Pass No. :
8. Name of contractor/agency with whom engaged at present :
9. Height pass required for work at m. Height
10. Description of present job :
11. Previous experience of working at height :

S.No.	Name of the employer	Duration of employment	Work experience
1.			
2.			

12. Does the applicant suffer from any of the following ailments? (If yes details to be given) :

(a) Blood pressure_____ (b) Epilepsy _____
(c) Flat foot _____(d) Frequent headache or reeling sensation_____
(e) Mental depression _____(f) Limping gait _____(g) Aerofobia _____

Declaration:

I hereby declare that the above information furnished by me is true and correct. I shall always wear the safety belt and tie the life-line whenever working at unguarded heights of 3 m and above. I shall not misuse the height pass issued to me or transfer it to any other person. I shall never come to duty or work at height/depth under the influence of alcohol/drugs.

Date:

Name:
Sign:

(Applicants Name and Signature or loss time injury (L.T.I) in case he cannot sign. In case of LTI an authorised person shall explain each point/item to the individual and certify on that behalf below the LTI)

I certify that I am satisfied with the above certification of the individual for the application of height pass and request for issue of height pass to him.

Name :
Sign:
(Agency Concerned)

Countersigned by:

Section Head (Facility)

PART-B

MEDICAL FITNESS CERTIFICATE

Certified that I, Dr. _____ have examined Shri. _____ aged on (date) who has signed below in my presence. General and physical examinations of Shri. _____ do not reveal any abnormality. He does not suffer from any acute/chronic skin disease or any contagious or infectious disease. His eye sight is normal with/without glasses. In my opinion, Shri. _____ is physically and mentally fit for working at height.

Details of examinations are given below:

Personal attributes: Medical aspects:

1. Height	: _____	1. Urine	: _____
2. Chest	: _____	2. Blood pressure	: _____
3. Weight	: _____	3. Epilepsy	: _____
4. Hearing	: _____	4. Flat foot	: _____
5. Sight	: _____	5. Frequent headache or reeling sensation	: _____
6. Skin : _____		6. Mental depression	: _____
7. Heart beating: _____		7. Limping gait : _____	
		8. Aerophobia : _____	

Name:
Signature and Rubber Stamp of
Signature of workman Medical Practitioner with
Reg. No.

PART-C

INDUSTRIAL SAFETY SECTION

(Considering the above medical certificate, the applicant has appeared on the following practical tests conducted by industrial safety section and the results are given below (strike off whichever is in-applicable)

a) Wearing a safety belt and tying the rope knot : Pass/fail
b) Walking over a horizontal structure at 3 m. : Pass/fail
c) height wearing a safety belt
d) General physique (OK/Not OK)

The above applicant's performance in the above tests has been satisfactory/ unsatisfactory due to the following.
So I certify and issue this height pass to Shri. _____ with Registration No._____ in the height pass register. This is valid for one year from the date of issue i.e. up to .....

Date: Name:

Signature

Scientific Assistant (Safety)

Safety Officer

APPENDIX-E

FORM - 1

APPLICATION FOR TEMPORARY POWER SUPPLY AND USE OF ELECTRICITY AT WORK SITE DURING CONSTRUCTION
[Prescribed under clause 10.6(d)]

1.	Name and address of user.	
2.	Reference of tender or work order (if applicable)	
3.	Name and designation of tender/work order issuing authority.	
4.	Power supply application number†	
5.	Name and designation of tender/work order/work supervising authority (engineer-in-charge).	
6.	Expected date of commencement of temporary supply	
7.	Expected date of decommissioning of temporary supply	
8.	Voltage level (LV/MV/HV)	
9.	Type of connection (1Ph/3Ph)	
10.	Connected load (Kw)	
11.	Maximum demand(KVA)/Power factor	
12.	Single line diagram* of proposed power distribution Enclosed (Form-1A)/Not scheme along with equipment data sheet (downstream enclosed installation after point of connection).	
13.	Name of overall supervisor and available qualified Enclosed (Form-1B)/Not Staff enclosed	
14.	Auxiliary equipment data sheet (meters, fire Enclosed (Form-1C/Not extinguisher, first aid box etc) enclosed	
15.	Name and designation of provider's representative to whom the application is addressed.	
16.	Name and designation of authorized signatory of user, who had submitted this application	

† Power supply application number shall be different for same user with multiple applications for temporary supply
* All the drawings and tables shall be signed by user's representative indicated against 16 above.

Signature of authorized signatory of user

Signed endorsement of work order supervising authority indicated against 5 above.

FORM - 1A

EQUIPMENT DATA SHEET FOR OBTAINING TEMPORARY POWER SUPPLY AND USE OF ELECTRICITY AT WORK SITE DURING CONSTRUCTION (Prescribed against item-12 of form-1)

Name and address of user:

Power supply application Number:
Amendment No:

References:- Single line diagram (SLD) of the power distribution scheme with all equipment details (attach the SLD)

1. 2. 3. Identity Type Make and model	4. Manufacturer's S.No	5. Fixed/ Portable	6. Size	7. Last used date	8. Last test date	9. Latest test data	10. Rating

Signature of authorized signatory of user

Explanation of column headers:

1. Identity:- Identification mark/number/tag of equipment in single line drawing and layout drawing. Every equipment in single line drawing and layout drawing shall have suitable identification mark/number/tag.
2. Type:- Cable/CB/MCB/MCCB/ELCB/transformer/lightning arrestor/earthing station/earthing connection/motor/lighting fixture/switch/fuse/switch, socket box etc.
3. Make and model:- manufacturer's name and corresponding model no.
4. Manufacturer's S. No:- serial number and date in name plate if available. Else NA
5. Fixed/portable:- Equipment is installed/laid/anchored to surface or portable.
6. Size:- depending upon type of equipment and as desired by provider representative e.g. length for cables or all dimensions if heavy equipment like transformer.
7. Last used date. date of last use else NEW
8. Last test date. latest test date by user or by manufacturer if NEW
9. Latest test data:- IR, HV, resistance, functional test data depending upon the type of equipment as desired by provider's representative.
10. Rating:- name plate rating of equipment like voltage, current, power (apparent, active, reactive), IP of enclosure, size (cable cross section) etc. depending upon the type of equipment and as desired by provider's representative.

FORM - 1B

STAFF DATA SHEET FOR OBTAINING TEMPORARY POWER SUPPLY AND USE OF ELECTRICITY AT WORK SITE DURING CONSTRUCTION (Prescribed against item-13 of form-1)

Name and address of user:

Power supply application Number:
Amendment No:-

1. Name	2. Address	3. Tel.No.	4. Responsibility	5. Certification detail	6. Resuscitation training	7. Experience	8. Other relevant training	9. Signature

Signature of authorized signatory of user

Explanation of column headers:

1. Name:- Name of agency/person
2. Address:-
3. Tel No:- regular, alternate and emergency telephone numbers
4. Responsibility:- whether responsible for installation, operation, maintenance, overall supervision etc. overall supervisor shall be indicated specifically.
5. Certification detail:- (a) type of certification e.g wire man license, electrical supervisor license, electrical contractor license, diploma in electrical engineering, degree in electrical engineering etc. (b) certifying agency e.g. state PWD, central PWD, CEA, name of college/university etc. (c) certificate/license number with date. (d) valid up to date or next renewal date must for contractor/supervisor license.
6. Artificial resuscitation training:- indicate YES/NO if the staff is trained to apply artificial resuscitation technique.
7. Experience.- number of years of experience.
8. Other relevant training: - any other training in electrical/ safety course. Indicate name of training, duration (days/months), training providing agency.
9. Signature:- original signature of individual.

FORM - 1C

AUXILIARY EQUIPMENT DATA SHEET FOR OBTAINING TEMPORARY POWER SUPPLY AND USE OF ELECTRICITY AT WORK SITE DURING CONSTRUCTION
(Prescribed against item-14 of form-1)

Name and address of user:

Power supply application Number:
Amendment No:-

Reference:- Layout drawing No. / _____

1. Identity	2. Type	3. Make and model	4. Manufacturer's S. No	5. Fixed/ Portable	6. Size	7. Last used date

Signature of user's representative

Explanation of column headers:

1. Identity:- identification mark/number/tag of equipment in layout drawing.
2. Type:- earthing rod/megger/multi meter/earth resistance meter/fire extinguisher/s and
3. bucket/first aid box/resuscitation chart/rubber mat etc.
4. Make and model:- manufacturer's name and corresponding model no.
5. Manufacturer's S. No:- serial number and date in name plate if available. Else NA
6. Fixed/portable:- equipment is installed/laid/anchored to surface or portable.
7. Size:- depending upon type of equipment and as desired by provider representative.
8. Last used date. NEW for new equipment. NA for passive devices like chart/mat etc.

FORM -1D

(Prescribed under clause 4.6(e)]

Name of user agency **Power supply application number:-**

CERTIFICATE BY THE LICENSED ELECTRICAL CONTRACTOR

Certified that subject installations have been carried out by us or checked by us and is in accordance with I.E. Rules. The documents submitted with subject temporary power supply application (Form-1) is verified by us and the complete installation confirms to these documents.

We shall periodically inspect/check the installation so that no unsafe situation arises during use of this temporary power supply system. We understand that for the entire duration of existence of this temporary power supply system we shall be responsible for any unsafe installation, operation, maintenance, testing of the same which results into any loss of life or material. We shall immediately report to the provider's representative and ensure de-energisation of supply if any unsafe situation arises during use of this temporary power supply system.

Signature of the authorized signatory of licensed electrical contractor

Rubber seal of licensed electrical contractor

Date

CERTIFICATE BY THE USER

Certified that my/our installations have been carried out in accordance with the I.E. Rules and that I/We have employed competent agency/staff to handle the installations which is strictly as per the staff data sheet submitted in Form-1B.

We understand that for the entire duration of existence of this temporary power supply system we shall be responsible for any unsafe installation, operation, maintenance, testing of the same which results into any loss of life or material. We shall immediately report to the provider's representative and ensure de-energisation of supply if any unsafe situation arises during use of this temporary power supply system.

Signature of the authorized signatory of user

Name of signatory

Date

FORM -1E

[Prescribed under clause 10.6(f)]
CERTIFICATE BY THE SAFETY OFFICER

Certified that I have inspected the electrical installation referred here in after satisfying myself about the safe condition of the installation, I hereby recommend that the service connection be given to the contractor.

Signature of the safety officer

Name:

Date:

AUTHORISATION BY THE ELECTRICAL ENGINEER

The subject power supply application along with completed installation, necessary certificates (as per Form-1 of Appendix-E) is scrutinized by us. The proposal found to be in order and the installation can be energized on in presence of your designated overall supervisor as indicated in Form-1B. Enclosed herewith the test report data sheet Form-1F. You are requested to carry out the periodic testing of equipment and submit the test report periodically as per this form.

Signature of the electrical engineer of provider

Name of signatory

Date

FORM - 1F

TEST/MAINTENANCE REPORT DATA SHEET OF EQUIPMENTS OF TEMPORARY POWER SUPPLY SYSTEM AT WORK SITE DURING CONSTRUCTION (Prescribed against form-1E)

Name and address of user:

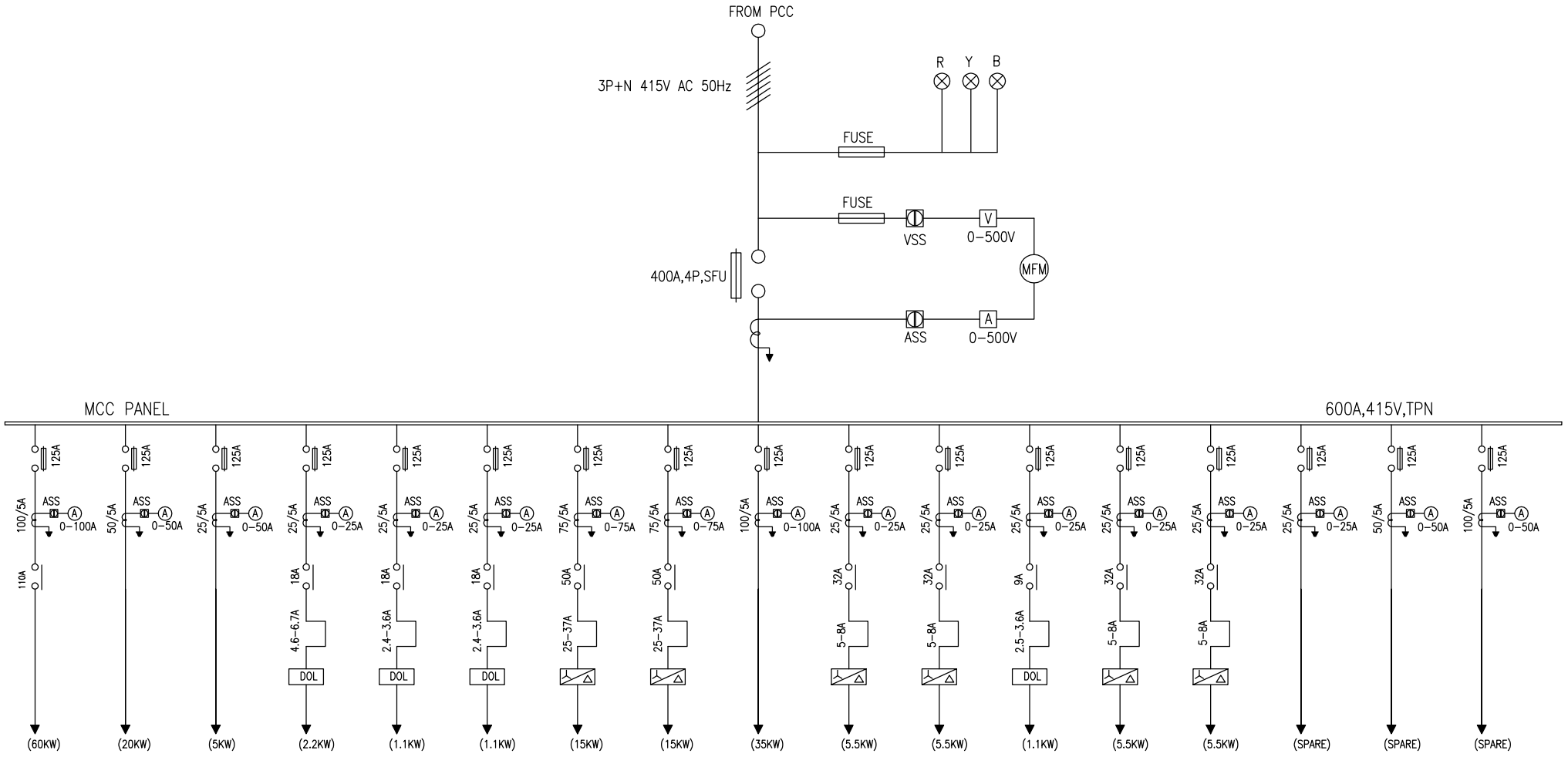
Power supply application Number:
Amendment No:-

1. Identity	2. Type	3. Last tested date	4. Next due date of any test	5 Frequency of IR test	6 Frequency of HV test	7. Frequency of earth resistance test	8. Other tests

Signature of electrical engineer of provider

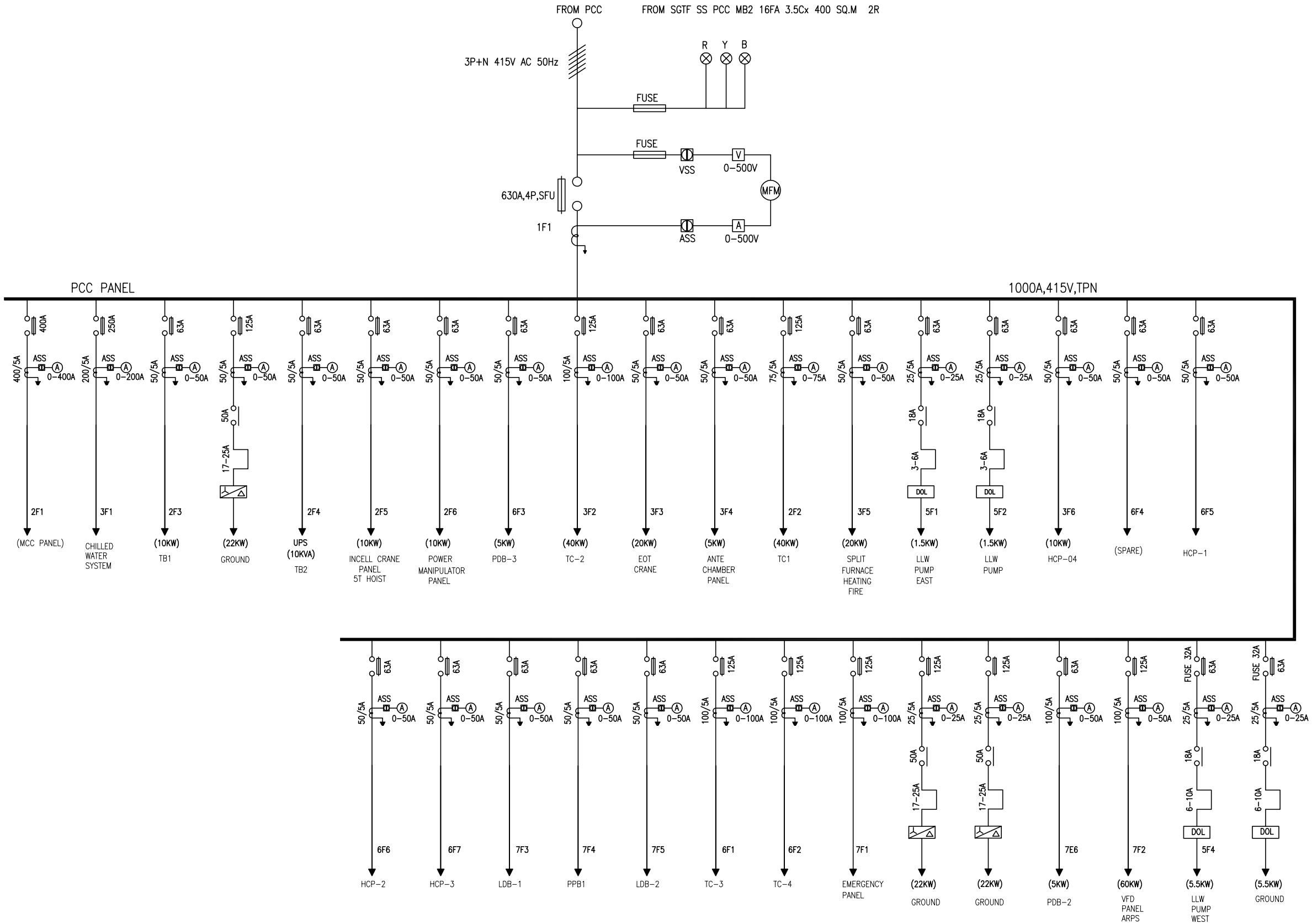
Explanation of column headers:

1. Identity:- Identification mark/number/tag of equipment in single line drawing and layout drawing. Every equipment in single line drawing and layout drawing shall have suitable identification mark/number/tag.
2. Type:-Cable/CB/MCB/MCCB/ELCB/transformer/lightning arrestor/earthing station/earthing connection/motor/lighting fixture/switch/fuse/switch, socket box etc.
3. Last test date: - latest test date indicated in Form-1A.
4. Next due date of any test:- as worked out by frequency of tests indicated in subsequent columns.
5. Frequency of IR test:- required frequency depending upon type of equipment and location of installation. NA if not required after installation.
6. Frequency of HV test:- required frequency depending upon type of equipment and location of installation. NA if not required after installation.
7. Frequency of earth resistance test:- required frequency depending upon type of equipment and location of installation. NA if not required after installation.
8. Other tests:- name and description of any other essential tests/maintenance activity and required frequency depending upon type of equipment and location of installation. NA if not required after installation.



GOVERNMENT OF INDIA	DRN.	MUNISHKUMAR S	
INDIRA GANDHI CENTRE FOR ATOMIC RESEARCH	CHD.	AKSK	
MATERIALS CHEMISTRY & METAL FUEL CYCLE GROUP	APPD.	SUJISH	
PROJECT : PYRO PROCESS RESEARCH AND DEVELOPEMENT FACILITY			
TITLE: MOTOR CONTROL CENTER PANEL SLD	SCALE	NTS	DATE: 29.01.2021
ORIGINATING AGENCY: MC&MFCG/PPED			
DRG.NO. IGC/MC&MFCG/PPED/2021/09			REV No. 00

DRG.NO.IGC/MC&MFCG/PPED/2021/09



GOVERNMENT OF INDIA	DRN.	MUNISHKUMAR S	
INDIRA GANDHI CENTRE FOR ATOMIC RESEARCH	CHD.	AKSK	
MATERIALS CHEMISTRY & METAL FUEL CYCLE GROUP	APPD.	SUJISH	
PROJECT : PYRO PROCESS RESEARCH AND DEVELOPEMENT FACILITY			
TITLE: POWER CONTROL CENTER PANEL SLD	SCALE	NTS	DATE: 09.02.2021
ORIGINATING AGENCY: MC&MFCG/PPED			
DRG.NO. IGC/MC&MFCG/PPED/2021/10	REV No. 00		

DRG.NO. IGC/MC&MFCG/PPED/2021/10

SCHEDULE 'F'

Reference to General Conditions of Contract.

Name of work	:	**Contract for Periodic preventive maintenance of Electrical power distribution, Motor control centre (MCC) & blower motors, Furnace equipments with control panel and various electrical works in the PPRDF at MC&MFCG, IGCAR, Kalpakkam.**
Estimated cost of work	:	**Rs. 25,00,000/-**
i) Earnest Money	:	**Rs.50,000/-**
ii) Performance Guarantee	:	**3% of the tendered value of the work.**
iii) Security Deposit	:	**2.5% of the tendered value of the work.**
GENERAL RULES & DIRECTIONS	:	Officer inviting tender **Superintending Engineer , MC&MFCG, IGCAR** **Maximum percentage of quantity of all items of work to be executed beyond which rate are to be determined in accordance with Clauses 12.2 & 12.3 See below**

Definitions :

2(v)	Engineer-in-charge	As intimated in the work order.
2(viii)	Accepting authority	Superintending Engineer, MC&MFCG, IGCAR
2(x)	Percentage on cost of materials and labour to cover all overheads and profits	15% (For arriving rate for extra item)
2(xi)	Standard schedule of rates	ESG, IGCAR Schedule of Rates (SOR)
2(xii)	Department	DAE, Government of India
9(ii)	Standard CPWD contract form	CPWD form 7/8 as modified and corrected up to 2005.

Clause - 1

i)	Time allowed for submission of Performance Guarantee from the date of issue of letter of Intent, in days	15 (Fifteen) days
ii)	Maximum allowable extension beyond the period provided in (i) above in days	7 days

Clause - 2

Authority for fixing compensation under clause 2	Superintending Engineer, MC&MFCG, IGCAR

Clause – 2A

Whether clause 2A shall be applicable	No

Clause - 5

Number of days from the date of issue of work order for reckoning date of start	0 days (Immediately on issue of Work order)

Mile stone(s) as per table given below

Table of Mile Stones(s)

Sl.No.	Description of Milestone (Physical)	Time allowed in days (from date of start)	Amount to be with-held in case of non achievement of milestone
1.			
2.			

(OR)

NOT APPLICABLE

Sl.No.	Financial Progress	Time allowed in days (from date of start)	Amount to be with-held in case of non achievement of milestone
1.	1/8th (of whole work)	1/4th (of whole work)	In the event of not achieving the necessary progress as assessed from the running payments, 1.5% of the tendered value of work will be withheld for failure of each milestone.
2.	3/8th (of whole work)	½ (of whole work)	
3.	3/4th (of whole work)	3/4th (of whole work)	
4.	Full	Full	

Time allowed for execution of work	**24 Months** including monsoon period

Clause – 6 or 6A

Clause applicable –(6 or 6A)	Clause 6A is applicable

Clause – 7

Gross work to be done together with net payment/adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment	**Not applicable**

Clause – 10B(ii)

Whether Clause 10B(ii) shall be applicable (yes or No) **No**

Clause – 10CA

Materials Covered under this clause	Nearest Material for which All India Wholesale Price index is to be followed
1.Base price of the Cement **(P) – Nil**	1.Cement
2.Base price of the Steel Reinforcement (P) **– Nil**	2.Steel (bars and rod)
3.Structural Steel **(P) – Nil**	3.Steel sheets ,Plates & strips
4.Bitumen **(P) - Nil**	4.Bitumen

NOT APPLICABLE

Clause – 10CC

Clause 10CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column. **(for breakup of components of escalation, refer clause 43, of section-III, special condition)**. **Components** Cement – **0%** Steel – **0.5%** Materials – **6%** Labour – **91 %** POL – **2.5**	**24 (Twenty Four) Months**

Clause – 11

Specifications to be followed for execution of work	DAE & CPWD, BIS, Indian Standard 'Special publication'.

Clause – 12

12.2 & 12.3	Deviation limit beyond which clauses 12.2 & 12.3 shall apply for all other items.	50%
	Overall Deviation limit	10%

Clause – 16

Competent Authority for deciding reduced rates :	Superintending Engineer, MC&MFCG, IGCAR

Clause – 17

Whether Clause 17 shall be applicable (Yes or No): Yes

Clause – 36(i)

Requirement of Technical Representative(s) and recovery Rate

Cost of work (In Lakh)	***Requirement of Technical Staff***		***Minimum Experience (years)***
	Qualification	**Number**	
More than 1000	i) Project Manager with degree in corresponding discipline of Engineering ii) Graduate Engineer iii) Graduate Engineer (or) Diploma Engineer	1 1 2 2	*10* *5* *Nil* *5*
500 to 1000	(i) Graduate Engineer (ii) Graduate Engineer Or Diploma Engineer	1 2 2	*5* *Nil* *5*
200 to 500	(i) Graduate Engineer (ii) Graduate Engineer Or Diploma Engineer	1 1 1	*5* *Nil* *5*
50 to 200	Graduate Engineer	1	*5*
1 to 50	*Graduate Engineer* *Or* *Diploma Engineer*	*1* *1*	*Nil* *5*

Sl.No.	**Qualification**	**Experience (Years)**	***Rate of recovery***
i	Project Manager with Degree	10	*Rs.20,000/- p.m*
ii	Graduate Engineer	5	*Rs. 15,000/- p.m*
iii	*Graduate Engineer or Diploma Engineer*	*Nil 5*	*Rs.10,000/- p.m*

Clause – 42

i) (a) Schedule / statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates (Latest Revision) printed by CPWD

ii) Variations permissible on theoretical quantities.

(a)	Cement for works with estimated cost put to tender not more than 2 lakhs	5% plus / minus
	for works with estimated cost put to tender more than 2 lakhs but up to 5 lakhs	4% plus / minus
	for works with estimated cost put to tender more than 5 lakhs	3% plus / minus
(b)	Bitumen all works	2.5% plus only & Nil on minus side
(c)	Steel reinforcement and structural steel sections for each diameter, section and category	5% plus / 4% minus
(d)	All other materials	Nil

iii) Recovery rate of Steel Reinforcement Nil
