दूरभाष :
286216/244200

TEL. :
286216/244200

एसटीडी कोड / STD CODE:
02525

फैक्स / FAX :
244200

सत्यमेव जयते

GOVERNMENT OF INDIA
BHABHA ATOMIC RESEARCH CENTRE
NUCLEAR RECYCLE BOARD
INTEGRATED NUCLEAR RECYCLE PLANTS
(OPERATION)

तारापुर कांप्लेक्स
TRARAPUR COMPLEX

डाक घर: घिवली
POST OFFICE: GHIVALI

द्वारा: बोइसर (पश्चिम रेलवे)
VIA: BOISAR (Western Railway)

जिला: पालघर – 401 502
DIST: **PALGHAR**- 401 502

TENDER COPY

NIT NO. – **BARC(T)/NRB/R&WM/WPF/E&I/C&I-FAS-CCTV/2025-26/WORK**

“Detailed Engineering, Fabrication, supply, Installation & Commissioning of control & Instrumentation system, CCTV Surveillance System, UPS System, Access Control system & fire alarm monitoring system for WPF plant at BARC/NRB Tarapur.”

DATE OF Online OPENING PART- A: 15/12/2025 AT 15:00 HRS.

CHECK LIST

BEFORE SUBMITTING THE TENDER THE TENDERES MUST CHECK THE FOLLOWING

SAY "YES'' OR "NO"

SR. NO.	DESCRIPTION	Say YES/NO
1	Have you submitted Earnest Money Deposit mention D.D. no. bank, date and amount? Is it in separate Envelope?	
2	Have you filled unit rates and amount in figures and words including all taxes and duties in schedule 'A'?	
3	Do you agree to complete the work within the stipulated period	
4	Do you agree to all the conditions of contract in total?(Wherever you differ, you should bring it out in the covering letter)	
5	Have you visited the site and understood the nature of work completely?	
6	Are you registered with the Central, State, PWD/MES/Railways if so, state Registration Number.	
7	Have you attached latest Income Tax clearance Certificate/PAN and Bank Solvency Certificate issued by nationalized bank?	
8	Have you enclosed the tender drawings and tender document with the offer?	
9	Have you Enclosed required documents in support of similar work experience and their performance?	
10	Have you ensured availability of required material from market?	

Government of India
Department of Atomic Energy
Bhabha Atomic Research Centre
Nuclear Recycle Board
R&WM Division

NOTICE INVITING e-TENDER

TENDER NOTICE NO : **BARC(T)/NRB/R&WM/WPF/E&I/C&I-FAS-CCTV/2025-26/WORK**

1. On line item rate tender in two parts i.e. Part A – Documents related to eligibility criteria and Part B – Financial Bid are hereby invited through **e-Tendering mode** on behalf of the President of India by (applicable competent authority - - **Executive Director**, Nuclear Recycle Board, Bhabha Atomic Research Centre for the following work from eligible bidders on approved list of CPWD, MES Railways, State PWDs Public Sector Undertakings of Central or State Governments/ Central Autonomous bodies or those having adequate experience and capabilities to execute similar works of such magnitude.

i)	Name of Work	:	**Detailed Engineering, Fabrication, supply, Installation & Commissioning of control & Instrumentation system, CCTV Surveillance System, UPS System, Access Control system & fire alarm monitoring system for WPF plant at BARC/NRB Tarapur**
ii)	Location of Work	:	SWMF, BARC, Tarapur
iii)	**Estimated Cost**	:	**Rs. 3,10,00,000/-**
iv)	**Earnest Money Deposit (EMD)**	:	**Rs. 6,20,000/-**

Note : Earnest Money in original shall be submitted at the office of E&I, WM, R&WM, BARC, TARAPUR, POST GHIVALI- 401502, before opening of Part-A preferably in the form of Fixed Deposit Receipt issued by Scheduled Bank / Demand Draft / Banker's Cheque of a Scheduled Bank, issued in favour of Pay and Accounts Officer, PREFRE BARC, Tarapur payable at Boisar, Maharashtra.

A part of Earnest Money is acceptable in the form of Bank Guarantee also. In such case minimum 50% of the Earnest Money or 20.00 Lakhs, whichever is less, shall be in the form prescribed above and balance can be accepted in the form of Bank Guarantee issued by a Scheduled Bank in favor of (applicable competent authority - ~~Project Manager / Project Director / Asst. General Manager~~ / **General Manager** / ~~Dy. Chief Executive / Chief Executive~~), as per Appendix 'F' of Tender Part 'A'. The bank guarantee submitted as a part of Earnest Money Deposit shall be valid for a period of six months or more from the date of submission of the tender. The Earnest Money deposited along with the bid shall be returned after receiving the Performance guarantee (after confirmation).

v)	Cost of Tender Document	:	**Nil**
vi)	Tender Processing Fee	:	**Rs.0/-**
vii)	Period of completion	:	**10** months
viii)	Dates of availability of Documents for download	:	From **21/11/2025 (12:00 Hrs.)** to till the last date and time of submission of online bid on website https://eprocure.gov.in//eprocure/app**. NIT is also available on website www.barc.gov.in for view only.**
ix)	Date & Location of Pre-bid meeting	:	The bidders are requested to send their Pre-bid queries by email not later than **30/11/2025.** Pre-Bid meeting will be held on **1/12/2025 at 14:00 HRS at AVS/WIP Conference Room, BARC Tarapur, Boisar (W), Maharashtra - 401502).** The Pre-Bid meeting clarifications will be uploaded in https://eprocure.gov.in/eprocure/app website by **03/12/2025**

x)	Period for online submission of tenders	:	**From 21/11/2025 (12:00 Hrs.) to 14/12/2025 (14:00 Hrs.)**
xi)	Date and time of online opening of Part A	:	**15/12/2025 (15:00 Hrs.)**
xii)	Date of opening of Part B of qualified bidders	:	Will be notified at a later date on https://eprocure.gov.in/eprocure/app.

Information, Eligibility Criteria, Conditions and Instructions

Information:

2. Tender document is prepared in two parts viz. Part 'A' (Documents related to eligibility criteria) and Part 'B' (Financial Bid). Part 'A' consists of Documents related to eligibility criteria viz. Section I – Notice Inviting e – Tender (English & Hindi versions), Section II – Form of Agreement and General Rules and Directions for the guidance of bidders, Memorandum, Section III – General Conditions of Contract, Additional conditions, Section IV – Special Instructions to bidders, Section V – Technical Specifications, Section VI – List of Tender Drawings, Section VII – Proforma of Schedules. Part 'B' (Financial bid) consists of Schedule 'A' – Schedule of Quantities and Rates.

The bidders must have Class-III digital signature certificate. To participate in the tender, Prospective Bidders are required to Login in the Home page of the website https://eprocure.gov.in/eprocure/app with their **User ID / Password and Class III Digital Signature Certificate.**

Prospective Bidders are required to download the **excel format** Price Bid and fill the **excel document** and upload the same **without renaming** it. Please refer Help Manual for submission of Tender / contact Help Desk as per NIT.

A set of tender drawings (Section VI) for the mentioned works will be made available to the bidder only for inspection in the office of E&I, WM, R&WM, BARC, TARAPUR, POST GHIVALI-401502 up to a working day before the last day of submission of tender and bidders, if required can come personally to study the drawings and the same shall not be available on the website.

Prospective bidder or his authorized representative shall bring photo identification like Passport, Voter's Identity Card, Driving License; PAN card for entry into BARC premises which is a restricted place. Prior intimation on phone or email shall have to be taken by the bidder so as to arrange entry to NRB, BARC, Tarapur.

All the above documents will form part of Agreement after award of work to the successful bidder.

Initial Eligibility Criteria:

3. The bidder should have the following:

(a) Registration in Appropriate Class of bidders, if any.
(b) Bank Solvency Certificate of a Scheduled Bank for a minimum of **Rs.1,24,00,000/-** and should not be older than one year from the date of opening of tender.
(c) Average Annual Financial Turnover should be at least **Rs. 1,55,00,000/-** during the immediate last three consecutive financial years ending **31st March 2024** This should be duly audited by a registered Chartered Accountant (Scan copy of certificate from Chartered Accountant to be uploaded).Year in which no turnover is shown, would also be considered for working out the average.
(d) Should not have incurred any loss in more than two years during last five years ending **31st March 2024.**This should be duly certified and audited by registered Chartered Accountant.
(e) Carried out similar works during last 7 years.

(f) The bidder should own constructions equipment as per list required for the proper and timely execution of the work. Else, he should certify that he would be able to manage the equipment by hiring etc. and submit the list of firms from whom he proposes to hire.
(g) The bidder should have sufficient number of Technical and Administrative employees for the proper execution of the contract.
(h) Copy of valid GST Registration Certificate.
(i) Copy of Permanent Account Number (PAN) Card.
(j) PF Registration Number.
(k) TDS Certificate/GST Certificate for proof of value of work executed for various clients.
(l) Bidder shall furnish a declaration that he has not been debarred from tendering by any Govt. Department /Public Sector Enterprise in last 7 years. In case the bidder is debarred, they should declare the details of debarment and submit copy of the order of debarment. The competent authority will decide on qualification of the bidder based on the merits of the case.
(m) Experience of having successfully and satisfactorily completed similar works in all respect (based on certification of by client of the works) during last Seven (07) years ending the previous day of last date of submission of tender. Works in Joint Ventures shall not be considered.
(n) The bidder should be "Class-I Local Supplier" as defined in Public Procurement (Preference to Make in India), Order-2017, Order No. "P-45021/2/2017-B.E. –II, Revision, dated 16/09/2020 and as amended from time to time.

4. The bidder should have satisfactorily completed (based on certification of performance by client of the works)
i) **3 (Three)** similar works, each of value not less than 40% of the estimated cost (Rs.1,24,00,000/-), or
ii) **2 (Two)** similar works, each of value not less than 60% of the estimated cost, or (Rs. 1,86,00,000/-)
iii) **1 (One)** similar work of value not less than 80% of estimated cost (Rs. 2,48,00,000/-)

during the last 7 (Seven) years ending on the previous day of last date of submission of tender and if the eligible similar works <u>are not carried out in</u> Central Government Department / State Government Department / Public Sector Undertaking of Central or State Governments / Central Autonomous Bodies, <u>TDS or GST certificates should be produced by bidder for the same</u>.

5. For the purpose, 'cost of work' shall mean gross value of the completed work including the cost of materials supplied by the Govt./ Client, but excluding those supplied free of cost. For the purpose of this clause, 'Similar Work' means **"Supply, Installation, of PLC based instrumentation system."** The similar works should be a work executed in India. The value of joint venture work is not acceptable.

6. The value of executed works shall be brought to the current costing level by enhancing the actual value of work at simple rate of 7% per annum, calculated from the date of completion to the last date of submission of bid.

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

Bidding Capacity = [A x N x 2]- B

Where,

A = Maximum turnover in works executed in any one year during last five years taking into account the completed as well as works in progress. **The value of completed works shall be bought 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 have been invited.

B= Value of existing commitments and on-going works to be completed during the period of completion of work for which bids have been invited.

8. Even though any bidder may satisfy the above requirements, he would be liable to disqualification, if:
i. bidder has made misleading or false representation or deliberately suppressed the information in the forms, statements and enclosures required in the eligibility criteria document,

ii. bidder has record of poor performance such as abandoning work, not properly completing the contract or financial failures/weaknesses etc.
iii. bidder has involved in any malpractices or fraudulent activities with the purpose of getting an unfair advantage.
iv. If any adverse input received against bidder from DAE Security.

9. Bidder should be a registered firm/company in India. Joint ventures and/or Consortiums are not acceptable.

Conditions:

10. After opening of Part 'A' of tender Competent Authority may constitute an inspection team which may visit selected work sites of ongoing / completed works of the bidders to evaluate the capability of the bidders based on the following:-

a) Financial capability and their turnover during the last 5 years.
b) Technical capabilities of the company in the light of subject work.
c) Nature of works executed by the bidder during last 7 years.
d) Organizational structure of the company.
e) Necessary Resource required by company to carry out the subject work.
f) Time & quality consciousness.
g) Tendency of the company with regard to making extraneous claims and disputes.
h) Site planning ability.
i) Tendency of the company to award the work on back to back / subletting.
j) Nature of debarment of the bidder (if any) by any government department/public sector enterprises.

Evaluation of documents related to eligibility criteria: This will be done in line with Annexure-1 of Appendix-20 of CPWD Works Manual 2014 before opening the financial bid based on eligibility criteria referred in NIT.

Financial evaluation of bids: The date of opening of Financial Bid shall be conveyed to the bidders whose Part-A (Documents related to eligibility criteria) is found satisfactory to the department and Part-B (Financial Bid) of such bidders only shall be opened.

The estimated cost of work indicated is only approximate and the contractor shall workout the rates in detail.

11. The applicant should also produce an affidavit along with the bid in the following format on Rs.100 stamp paper attested by a Public Notary:

"I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back to back basis. We confirm that the company is not under liquidation. Further we have understood that, if such a violation comes to the notice of Department, then I/We may be debarred for tendering in NRB, BARC Contracts in future."

ALSO

"I have read the clause in Annexure-I regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. I hereby certify that this bidder fulfils all requirements in this regard and is eligible to be considered." (Where applicable, evidence of valid registration by the Competent Authority shall be attached.)

12. No modifications in the tender shall be allowed after opening Part 'A'.

13. Tenders with any condition including conditional rebate shall be rejected. However, tenders with unconditional rebate will be accepted.

14. If any information furnished by the applicant is found to be incorrect, they shall be liable to be debarred from tendering/ taking up works in BARC in future and the Government shall without

prejudice to any right or remedy, be at liberty to forfeit the Earnest Money absolutely. Further, if such a violation comes to the notice of Department before start of the work, the Engineer-in-charge shall be free to **forfeit** the entire amount of Earnest Money Deposit/Performance Guarantee.

15. The time allowed for carrying out the work will be reckoned from the 15th day from the date of issue of work order or actual date of start of work whichever is earlier.

16. Tender shall be kept valid for **90 days** from the Last date of closing of online submission of tenders. If any bidder withdraws his tender within the validity period and before award of work whichever is earlier or makes 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 bidder shall not be allowed to participate in the re-tendering process of the work.

17. In case the last date opening of tender is declared as holiday, the date shall be treated as postponed to the next working day, correspondingly.

18. The prospective bidder should upload scanned copy of the EMD documents such as FDR/DD/BC/BG as described in 1(iv). The originals of EMD documents and affidavit as described in Clause 11 shall be submitted at the office of R&WM, E&I section, AVS, INRP(O), NRB, BARC, Tarapur, Boisar, Post office Ghivli, Boisar, Palghar Maharashtra Pin code-401502) before opening of Part-A failing to which the tender will be rejected.

19. The Security Deposit at 2.5% of gross amount of the bill shall be deducted from each running bill as well as final bill of the contractor till the sum deducted will amount to Security Deposit of 2.5% of the tendered value of the work.

The Security Deposit will also be accepted in the form of Demand Draft/Banker's Cheque from Scheduled Bank. Fixed Deposit Receipt of a Scheduled Bank will also be accepted.

20. In addition, the contractor shall be required to deposit an amount equal to 5% of the tendered value of the contract as performance guarantee in the form of Demand Draft / Fixed Deposit Receipt / Bank Guarantee / Banker's Cheque from Scheduled bank to be submitted within 15 days from the date of issue of work order or before commencement of work whichever is earlier.

21. If the successful bidder, fails to furnish the prescribed performance guarantee within 15 days (and subject to grace period mentioned in Schedule F) from the date of issue of work order or before commencement of work, whichever is earlier, the department (BARC) shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely without any notice.

22. The acceptance of tender shall rest with department which does not bind itself to accept the lowest tender and reserves to itself the authority to reject or all of the tenders received, without assigning any reason. All tenders in which any of the prescribed conditions are not fulfilled or incomplete in any respect are liable to be rejected.

23. Canvassing in connection with tenders is strictly prohibited and the tenders submitted by the bidders who resort to canvassing will be liable for rejection.

24. The department reserves the right to accept the whole or only part of the tender and the bidder shall be bound to perform the same at the rates quoted.

25.

i. Quoted rates shall be inclusive of GST and shall be payable by the bidder and NRB, BARC will not entertain any claim whatsoever in this respect. The bidder should be registered under Goods & Service Tax (GST) and GST as applicable as per extant order on the work shall be paid by the contractor to concerned tax authorities.
ii. Labour welfare cess, if applicable, shall be recovered from each bill paid to the contractor.

iii. Income tax, GST TDS and any other tax as applicable shall be deducted from each bill paid to the contractor.
iv. All the workers are to be paid applicable minimum wages.
v. The bidder should be registered under EPF and ESIC. The contractor shall pay EPF and ESIC of contract workers to concerned Agencies. EPF and ESIC (employer's contribution in both) shall be reimbursed by the Department after satisfying that it has been actually and genuinely paid by the contractor. The bidder should not consider EPF and ESIC in his rates.

26. The successful bidder whose tender is accepted will be required to obtain Police Verification Certificate (PVC) issued by Police Department at his own cost for all his workmen i.e. Engineers, Supervisors and Labourer's to work inside BARC

In case of receipt of any adverse character and antecedent remarks / notification against the Contractor/ Company / firm / proprietor and / or his contract personnel, consequent to the security vetting, BARC reserves absolute right to terminate the contract forthwith without assigning reason/ show cause notice. Under the circumstance the Contractor will have no right to claim good any losses / liability that may be incurred as consequence to the above action initiated by BARC. BARC also reserves the right to forfeit in part/full performance security and/ or security deposit in possession of the Government for failure on the part of the contractor to abide / adhere to the Security instruction issued by DAE / BARC from time to time.

Instructions:

27. The bidder should be registered with https://eprocure.gov.in/eprocure/app Those bidders not registered on the website mentioned above, are required to get registered. If needed, they can be imparted training for online bidding process as per details available on the website.

28. Tenders will be received online up to time & date as mentioned above. Part A will be opened on the time & date as mentioned above. After opening of Part A, for evaluation, the bidder's ongoing / completed work sites & offices may be visited. The documents related to eligibility criteria will be evaluated and accordingly bidders will be qualified. Qualified bids shall then be opened at notified date and time. Date of opening of Part 'B' (Financial Bid) will be intimated to all bidders by email.

29. The bidder can login and see the status of Bids after opening.

30. Bidder must ensure to quote rate of each item. The Financial bid is provided as **BOQ_WPF_EI.xls** along with this tender document at https://eprocure.gov.in/eprocure/app. Bidders are advised to download this **BOQ_WPF_EI.xls** as it is and quote their rates in the permitted (unprotected) cells which appears in different colour 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. **Bidder shall not tamper / modify downloaded price bid template in any manner**. If any cell is left blank and no rate is quoted by the bidder, rate of such item shall be treated as "0" (ZERO).

31. List of Documents to be scanned from original & uploaded within the period of bid submission by bidder:

i. Financial Turn Over certified by CA (with **UDIN** preferably).
ii. Profit & Loss statement for preceding 5 financial years ending March 2024 certified by CA (with **UDIN** preferably).
iii. Latest Bank Solvency Certificate.
iv. List of Construction Plants and Machinery/ equipment required for the execution of the work
v. List of Technical Staff required for the execution of the work
vi. PAN (Permanent Account Number) Card

vii. Copy of EMD documents such as FDR/DD/BC/BG

viii. List of Similar Works completed in last seven years indicating i) Agency for whom executed, ii) Value of work, iii) Stipulated and Actual time of completion, iv) Performance certificates of the eligible similar works from the clients.
List of Works in Hand indicating: i) Agency ii) Value of Work, iii) Stipulated time of completion / present position.

ix. Certificates:
   a) Registration certificate, if any
   b) Certificates of Work Experience / Performance Certificates
   c) GST Registration Certificate
   d) PF Registration certificate.

x. Undertaking that the eligible similar works(s) have not been executed through another contractor on back to back basis.

xi. Declaration as per Part A: Section II & Clause 11 of General Conditions of Contract.

xii. Valid Electrical license, if applicable

xiii. Declaration that the bidder has not been debarred as described in 3(I)

xiv. Undertaking pursuant to section 206AB of Income Tax Act, 1961 in the format attached in Annexure-II in the company letter head.

xv. Undertaking in official letter head regarding be "Class-I Local Supplier" as defined in Public Procurement (Preference to Make in India) as per Annexure-III.

Note: During technical evaluation relevant documents, if any, can be asked by inspection committee for submission.

Notes:

1. Registered bidders can only submit / upload tenders.
2. Interested agencies may visit website https://eprocure.gov.in/eprocure/app for registration.
3. Contact or assistance / clarifications (02525) 286225,286238,286285
4. Contact for assistance for registration and participation in e-Tendering:
   a) Shri. Bhushan Kumar and Shri. Mayur Jadhav Ph no. 022-25487480
   b) For any technical related queries please call at 24 x 7 Help Desk Number .
      1) 0120-4001 002
      2) 0120-4001 005
      3) 0120-6277 787
5. Email Ids for sending request for site visit / clarifications
   To kchaturvedi@barc.gov.in, gvkamath@barc.gov.in, rhemant@barc.gov.in

In case of any difference in English and Hindi version of NIT, the English version will prevail.

E.D. (FF) & Director GSO (T)
For and on behalf of President of India

Annexure-I to NIT No: BARC(T)/NRB/R&WM/WPF/E&I/C&I-FAS-CCTV/2025-26/WORK

I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority.

II. “Bidder” (including the term ‘tenderer’, ‘consultant, or ‘service provider’ in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.

III. “Bidder from a country which shares a land border with India” for the purpose of this order means:-

a. An entity incorporated, established or registered in such a country; or
b. A subsidiary of an entity incorporated, established or registered in such a country; or
c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
d. An entity whose beneficial owner is situated in such a country; or
e. An Indian (or other) agent of such an entity; or
f. A natural person who is a citizen of such a country; or
g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.

IV. The beneficial owner for the purpose of (iii) above will be as under:

1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.
Explanation:
a. “Controlling ownership interest” means ownership of or entitlement to more than twenty-five per cent. of shares or capital or profits of the company.
b. “Control” shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements

2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership

3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals

4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official

5. In case of trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

V. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.

VI. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

Annexure-II to NIT No: BARC(T)/NRB/R&WM/WPF/E&I/C&I-FAS-CCTV/2025-26/WORK

TO WHOMSOEVER IT MAY CONCERN

Undertaking pursuant to Section 206 AB of the Income Tax Act 1961
Declaration confirming filling of Income Tax Return from immediate two preceding years.

I, _____ [Name], in the capacity of Individual/ Proprietor/ Partner/ Director/ Authorized signatory of ---------- [Entity Name] with PAN _____, do hereby make the following declaration as required under the relevant provision of the Income Act ,1961 (hereinafter referred as 'the Act'):

1. That I/We am/are authorized to make this declaration in the capacity as Individual / Proprietor/ Partner/ Director.
2. I/We hereby declare and confirm that I/We do not fall under the definition of 'specified person' as provided in section 206AB of the IT Act.
3. I/We have duly filed return of income for FY ------ & FY ------- within due date as per Section 139(1) of the Income-tax Act, 1961 – Yes / No (Strike out whichever is not applicable).
4. IF return has been filed the details are as follows:

I/We, _____ having PAN_____, hereby confirm that the provision of Section 206 AB is not applicable in my/our case as I/We am/are regular in filling of Income Tax Return. The details (along with proof of documents) of acknowledgement numbers and date of filling of Income Tax Return for last two financial years are furnished below:

S. No.	Financial Year / (Assessment Year)	Date of Filing Income Tax Return	ITR Acknowledgement Number
1	---------- / (----------)		
2	---------- / (----------)		

5. I/We hereby take responsibility for any loss/liability fully including any Tax, interest, penalty, etc. that may arise due to incorrect reporting of above information.

All the aforesaid representations are true and correct, and we/I agree to furnish any evidence required at any time in support thereof.

On behalf of _____

<< Name of the authorised signatory>>

<< Designation>>

Name of the Entity:

Seal :

Date :

Annexure-III

Undertaking for t*he provisions of* Public Procurement (Preference to Make in India), Order-2017, Order No. P-45021/2/2017-B.E. –II, Revision, dated 16/09/2020 and as amended from time to time.

NIT No. : BARC(T)/NRB/R&WM/WPF/E&I/C&I-FAS-CCTV/2025-26/Work

NAME OF WORK: Detailed Engineering, Fabrication, supply, Installation & Commissioning of control & Instrumentation system, CCTV Surveillance System, UPS System, Access Control system & fire alarm monitoring system for WPF plant at BARC/NRB Tarapur

In reference to above mentioned Tender reference, I/we M/s……. (Supplier Name) hereby certify that the products/ Services offered ---------- (Name of the Work) meet the requirement of the minimum local content as prescribed for "Class -1 Local Supplier" as mentioned in DPIIT order of Public Procurement (Preference to Make in India), Order-2017, Order No. "P-45021/2/2017-B.E. –II, Revision, dated 16/09/2020 and as amended from time to time.

We hereby confirm that the Local content for above mentioned work is……. % of total value of Work order.

Seal and Signature of Authorised Signatory.

Note: In case Procurement cost exceeds Rs. 10 Crore, this Percentage of Local content shall be certified statutory auditor/ cost auditor of company/ practicing cost accountant /practicing chartered accountant as defined in the above order.

GOVERNMENT OF INDIA

BHABHA ATOMIC RESEARCH CENTRE

Nuclear Recycle Board, Tarapur

(SECTION – II)

GENERAL RULES AND DIRECTIONS

GENERAL RULES AND DIRECTION

1. All works proposed for execution by contract will be notified in a form of invitation to tender pasted in public places and signed by the Officer inviting tender or by publication in Newspapers as the case may be. This form will state the work to be carried out, as well as the date for submitting and opening tenders and the time allowed for carrying out the work, also the amount of earnest money to be deposited with the application, and the amount of Security Deposit and Performance Guarantee to be deposited by the successful bidder and the percentage, if any, to be deducted from the bills. Copies of the specifications, designs and drawings any other documents required in connection with the work signed for the purpose of identification by the officer inviting tender shall also be open for inspection by the contractor at the office of the officer inviting tender, during office hours.

2. In the event of the tender being submitted by a firm, it must be signed separately by each partner, 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 that the firm is duly registered under the Indian Partnership Act, 1952.

3. Receipts for payments made on account of work, when executed by a firm, must also be signed by all the 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 person having due authority to give effectual receipts for the firm.

4. Any person, who submits a tender, shall fill up the usual printed 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 conditions of any sort, including conditional rebates, will be summarily rejected. No single tender shall include more than one work, but contractors who wish to tender for two or more works shall submit separate tender for each. Tender shall have the name and number of the works to which they refer, written on the envelopes. The rate(s) must be quoted in decimal coinage. Amounts must be quoted in full rupees by ignoring fifty paisa and considering more than fifty paisa as rupee one.

In case the lowest tendered amount (worked out on the basis of quoted rate of Individual items) of two or more contractors is same, then such lowest contractors may be asked to submit sealed revised offer quoting rate of each item of the schedule of quantity for all sub sections/sub heads as the case may be, but the revised quoted rate of each item of schedule of quantity for all sub sections/sub heads should not be higher than their respective original rate quoted already at the time of submission of tender. The lowest tender shall be decided on the basis of revised offer. If the revised tendered amount (worked out on the basis of quoted rate of individual items) of two or more contractors received in revised offer is again found to be equal, then the lowest tender, among such contractors, shall be decided by draw of lots in the presence of tender inviting authority/ representatives appointed by tender inviting authority and the lowest contractors those have quoted equal amount of their tenders.
In case of any such lowest contractor in his revised offer quotes rate of any item more than their respective original rate quoted already at the time of submission of tender, then such revised offer shall be treated invalid. Such case of revised offer of the lowest contractor or case of refusal to submit revised offer by the lowest contractor shall be treated as withdrawal of his tender before acceptance and 50% of his earnest money shall be forfeited. In case all the lowest contractors those have same tendered amount

(as a result of their quoted rate of individual items), refuse to submit revised offers, then tenders are to be recalled after forfeiting 50% of EMD of each lowest contractors. Contractor, whose earnest money is forfeited because of non-submission of revised offer, or quoting higher revised rate(s) of any item(s) than their respective original rate quoted already at the time of submission of his bid shall not be allowed to participate in the re-tendering process of the work.

5. The officer inviting tender or his duly authorized 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 shall thereupon be given to the contractor who shall thereupon for the purpose of identifications sign copies of the specifications and other documents mentioned in Rule 1. In the event of a tender being rejected, the earnest money shall thereupon be returned to the contractor remitting the same, 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 or any other 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 officer inviting tender and the contractor shall be responsible for seeing that he procures a receipt signed by the officer inviting tender or a duly authorized Cashier.

8. The memorandum of work tendered for and the schedule of materials to be supplied by NRB and their issue rates, shall be filled and completed in the office of the officer inviting tender before the tender form is issued. If a form is issued to an intending bidder without having been so filled in and incomplete, he shall request the officer to have this done before he completes and delivers his tender.

9. The bidders shall sign a declaration under the officials Secret Act 1923, for maintaining secrecy of the tender documents drawings or other records connected with the work given to them. The unsuccessful bidders shall return all the drawings given to them.

9A. Use of correcting fluid, anywhere in tender document is not permitted. Such tender is liable for rejection.

10. In the case of item rate tenders, only rates quoted shall be considered. Any tender containing percentage below/above the rates quoted is liable to be rejected. 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 a discrepancy is found the rate which correspond with the amount worked out by the contractor shall unless otherwise proved be taken as correct. If the amount of an Item is not worked out by the contractor or it does not correspond with the rates written either in figures or in words, then the rates quoted by the contractor in words shall be taken as correct. Where the rates quoted by the contractor in figures and in words tally, but the amount is not worked out correctly, the rates quoted by the contractor will unless otherwise proved be taken as correct and not the amount. In event no rate has been quoted for any item(s), leaving space both in figure(s), word(s) and amount blank, it will be presumed that the contractor has included the cost of this/these item(s) in other items and rate for such item(s) will be considered as zero and the work will be required to be executed accordingly.

11. 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 bidder is unable to provide satisfactory explanation, such a tender is liable to be disqualified and rejected.

12. All rates shall be quoted on the tender form. The amount for each item should be worked out and requisite totals given. Special care should be taken to write the rates in figures as well as in words and the amount in figures only, in such a way that interpolation is not possible. The total amount should be written both in figures and in words. In case of figures, the word 'Rs.' should be written before the figure of rupees and word `P` after the decimal figures, e.g., `Rs.2.15 P' and in case of words the word 'Rupees` should precede and the word 'Paisa' should be written at the end. Unless the rate is in whole rupees and followed by the word `only' it should invariably be up to two decimal places. While quoting the rate in schedule of quantities, the word `only` should be written closely following the amount and it should not be written in the next line.

13.(i) The contractor whose tender is accepted, will be required to furnish ***Performance Guarantee of 5% (five percent)*** of the tendered amount within the period specified in ***Schedule - F***. This guarantee shall be in the form of cash (in case guarantee amount is less than Rs. 10,000/-) or Deposit at call receipt of any scheduled bank/Banker's cheque of any scheduled bank/Demand Draft of any scheduled bank/Pay order of any scheduled bank (in case guarantee amount is less than Rs. 1,00,000/-) or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the prescribed form.

(ii) The contractor whose tender is accepted will also be required to furnish by way of ***Security Deposit*** for the fulfilment of his contract, an amount equal to ***2.5%*** of the tendered value of the work. The Security deposit will be collected by deductions from the running bills as well as final bill of the contractor at the rates mentioned above. The Security amount will also be accepted in cash or in the shape of Government Securities or Fixed Deposit Receipt of a Scheduled Bank or State Bank of India will also be accepted for this purpose provided confirmatory advice is enclosed. **Earnest Money deposited along with bid shall be returned after receiving performance Guarantee.**

14. On acceptance of the tender, the name of the accredited representative(s) of the contractor who would be responsible for taking instructions from the Engineer in charge shall be communicated in writing to the Engineer-in-Charge.

15. GST or any other tax applicable in respect of inputs procured by the contractor for this contract shall be payable by the contractor and Government will not entertain any claim whatsoever in respect of the same. However, component of GST at time of supply of service (as provided in CGST Act 2017) provide by the contract shall be varied if different from that applicable on the last date of receipt of tender including extension if any.

16. The contractor shall give a list of both gazetted and non-gazetted NRB/BARC employees related to him.

17. The tender for the work shall not be witnessed by a contractor or contractors who himself/themselves has/have tendered or who may and has/have tendered for the same work. Failure to observe this condition would render, tenders of the contractors tendering, as well as witnessing the tender, liable to summary rejection.

18. The tender for composite work includes, in addition to building work, all other works such as sanitary and water supply installations drainage installation, electrical work, horticulture work, roads and paths etc. The bidder, apart from being a registered contractor (B&R) of appropriate class, must associate himself with agencies of appropriate class which are eligible to tender for sanitary and water supply drainage, electrical and horticulture works in the composite tender.

19. The contractor shall submit list of works which are in hand (progress) in the following form:

Name of work	Name & particulars of work is being executed	Value of work:	Position of works in progress:	Remarks
1	2	3	4	5

20. 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 reach of the contract and the Chief Executive, NRB may in his discretion, without prejudice to any other right or remedy available in law, 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.

ITEM RATE TENDER FOR WORKS

(a) General Description (Name of Work): *"----------."*
(b) Estimated Cost : RS. ---------- (Rupees ---------- only).

(c) Earnest Money : RS. ---------- (Rupees ---------- only).

(d) Security Deposit : 2.5% of the tendered value of the work

(e) Performance Security: 5% of the tendered value of the work

I / We have examined the notice inviting tender, ***Schedule A, B, C, D, E & F***, specifications applicable, Drawings, designs, General Rules & Directions, Conditions of Contract, Clauses of Contract, Special Conditions & other documents and rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the 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 respect with the specifications, designs, drawing and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the Conditions of contract and with such materials as are provided for, by, and in respect of accordance with, such conditions so far as applicable.
We agree to keep the tender open for one hundred and Twenty (120) days from the due date of its opening

If I/We, fail to furnish the prescribed performance guarantee within prescribed period. I/We agree that the said President of India or his successors, in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I/We fail to commence work as specified, I/We agree that President of India or the successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said earnest money and the performance guarantee absolutely, otherwise they said earnest money shall be retained by him towards security deposit to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 12.2 and 12.3 of the tender form. Further, I/We agree that in case of forfeiture of Earnest Money & Performance Guarantee as aforesaid. I/We shall be debarred for participation in the re-tendering process of the work.

Further, I / we agree that in case of forfeiture of earnest money or both earnest money & performance guarantee as aforesaid, I / we shall be debarred for participation in the re-tendering process of the work.

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 tendering in NRB in future forever. 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.

DECLARATION

I/We, hereby declare that I/We shall treat the tender documents drawings and other records connected with the work as Secrete/Confidential documents and shall not communicate information /derived there from to any person other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the state.

Dated_____ day of_____.

BIDDERS SIGNATURE & SEAL

Witness …….

Address……

…….

Occupation ……..

ACCEPTANCE

The above tender is hereby accepted by me for and on behalf of the President of India.

Dated the _____Day of _____

Tender Inviting Authority,

INRPO,NRB, BARC(T)

For and on behalf of the President of India

GOVERNMENT OF INDIA

BHABHA ATOMIC RESEARCH CENTRE

Nuclear Recycle Board, Tarapur

(SECTION – III)

GENERAL CONDITIONS OF CONTRACT

III (1) - CONDITIONS OF CONTRACTS

DEFINITIONS -

1. The **Contract** means the documents forming the tender and acceptance thereof and the formal agreement executed between the competent authority on behalf of 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-in-Charge 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 expression shall, unless the context otherwise requires, have the meanings hereby respectively assigned to them:

I. 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.

II. 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.

III. The '**Contractor**' shall mean the individual, or firm or company, whether incorporated or not, undertaking the works and shall include the legal personnel representative of 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 company.

IV. The '**President**' means the President of India and his successors.

V. The 'Engineer-in-Charge' means the authorised representative or, Head as the case may be of the **INRPO**, Nuclear Recycle Board, Tarapur who shall supervise and be in charge of the work and who shall sign the contract on behalf of the President.

VI. '**Government' or 'Government of India'** shall mean the President of India.

VII. Accepting Authority shall mean the authority mentioned in Schedule 'F'.

VIII. Excepted risk are risks due to riots (other than those on account of contractor's employees), war (whether declared or not) invasion, act of foreign enemies, hostilities, civil war, rebellion revolution, insurrection, military or usurped power, any acts of government, damages from air craft, acts of God such as earthquake, lightening and unprecedented floods, and other causes over which the contractor has no control and accepted as such by the Accepting Authority or causes solely due to use or occupation by Government of the part of the works in respect of which a certificate of completion has been issued or a cause solely due to Government`s faulty design of works.

IX. 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 mentioned in Schedule - F to cover, all overheads and profits.

X. '**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.

XI. Schedule(s) referred to in these conditions shall mean the relevant schedule(s) annexed to the tender papers or the standard Schedule of Rates of the Government mentioned in Schedule - F hereunder, with the amendments thereto issued up to the date of receipt of the tender.

XII. Department means Nuclear Recycle Board (NRB), Department of Atomic Energy, Government of India which invites tenders on behalf of President of India as specified in Schedule - F.

XIII. District Specifications means the specifications followed by the State Government in the area where the work is to be executed.

XIV. Date of commencement of work: The date of commencement of work shall be the date of start as specified in Schedule - F or the first date of handing over of the site, whichever is later, in accordance with the phasing if any, as indicated in the tender document.

XV. '**Tendered value'** means the value of the entire work as stipulated in the letter of award.

XVI.GST shall mean Goods and Service Tax- Central, State and Inter State.

SCOPE AND PERFORMANCE –

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 rates 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.

WORKS TO BE CARRIED OUT –

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 (Schedule – B) 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.

SUFFICIENCY OF TENDER –

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.

DISCREPANCIES AND ADJUSTMENT OF ERRORS –

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.

SIGNING OF 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 the 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.

i. Standard C.P.W.D Form as mentioned in Schedule 'F' consisting of:

a) Various standard clauses with corrections up to the date stipulated in Schedule 'F' along with annexure thereto.

a) C.P.W.D. Safety Code.

b) Model Rules for the protection of health, sanitary arrangements for workers employed by CPWD or its contractors.

c) CPWD Contractor's Labour Regulations.

d) List of Acts and omissions for which fines can be imposed.

iii. No payment for the work done will be made unless contract is signed by the contractor

III (2) - CLAUSES 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 up to 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 Cash (in case guarantee amount is less than Rs. 10,000/-) or Bankers cheque/Demand draft of any Scheduled Bank (in case guarantee amount is less than Rs. 1, 00,000/-) or Fixed deposit receipts / Bank guarantee/Pay Order from scheduled bank or the State Bank of India in accordance with the form annexed as Appendix 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 up to 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. However, in case of contracts involving maintenance of building and services/any other work after construction of same building and services/other work, then 50% of Performance Guarantee shall be retained as Security Deposit. The same shall be returned year wise proportionately

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.

(v) On substantial Completion of any work which has been completed to such an extent that the intended purpose of the work is met and ready to use, then a provisional Completion certificate shall be recorded by the Engineer-in-Charge. The provisional certificate shall have appended with a list of outstanding balance item of work that need to be completed in accordance with the provisions of the contract.

This provisional completion certificate shall be recorded by the concerned Engineer-in–charge with the approval of competent authority defined in 'Schedule F'. After recording of the provisional Completion Certificate for the work by the competent authority, the 80% of performance guarantee shall be returned to the contractor, without any interest.
However in case of contracts involving Maintenance of building and services / any other work after construction of same building and services/ other work, then 40% of performance guarantee shall be returned to the contractor, without any interest after recording the provisional Completion certificate.

CLAUSE 1A: 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 and final bill till the sum deducted will amount to security deposit of 2.5% of the tendered value of the work Such deduction will be made and held by Government by way of security deposit unless he/they has/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 compensations 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 or 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 and Accounts Officer, PREFRE, BARC Tarapur, 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 deposited 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 Rs.5 Lakhs.

Provided further that the validity of bank guarantee including the one given against the earnest money shall be in conformity with provisions contained in clause 17 which shall be extended from time to time depending upon extension of contract granted under provisions of clause 2 and clause 5.

In case of contracts involving maintenance of building and services/any other work after construction of same building and services/other work, then 50% of Performance Guarantee shall be retained as Security Deposit. The same shall be returned year wise proportionately.

NOTE 1: Government papers tendered as security will be taken at 5% below its market price or at its face value, whichever is less. The market price of Government papers would be ascertained by the Divisional Officer 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 justified extended date of completion, as per clause 5 (excluding any extension under Clause 5.5) as well as any extension granted under clauses 12 and 15, 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*** may decide on the amount of Tendered Value of the work for every completed day/month (as determined) 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. Compensation for delay of work - @1% 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 Sectional part of work as mentioned in Schedule 'F' For which a separate period of completion is originally given.

In case no compensation has been decided by the authority in Schedule 'F' during the progress of work, this shall be no waiver of right to levy compensation by the said authority if the work remains incomplete on final justified extended date of completion. If the Engineer in Charge decides to give further extension of time allowing performance of work beyond the justified extended date, the contractor shall be liable to pay compensation for such extended period. If any variation in amount of contract takes place during such extended period beyond justified extended date and the contractor becomes entitled to additional time under clause 12, the net period for such variation shall be accounted for while deciding the period for levy of compensation. However, during such further extended period beyond the justified extended period, if any delay occurs by events under sub clause 5.2, the contractor shall be liable to pay compensation for such delay.

Provided that compensation during the progress of work before the justified extended date of completion for delay under this clause shall be for non-achievement of sectional completion or part handing over of work on stipulated/justified extended date for such part work or if delay affects any other works/services. This is without prejudice to right of action by the Engineer in Charge under clause 3 for delay in performance and claim of compensation under that clause.
In case action under clause 2 has not been finalized and the work has been determined under clause 3, the right of action under this clause shall remain post determination of contract but levy of compensation shall be for days the progress is behind the schedule on date of determination, as assessed by the authority in Schedule F, after due consideration of justified extension. The compensation for delay, if not decided before the determination of contract, shall be decided after of determination of contract .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 withheld, to be adjusted against the compensation levied as above. 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 stipulated date of completion or justified extended date of completion as determined under clauses 5.3, 12 & 15, a bonus @ 1% (one per cent) 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 per cent) of the tendered value. Provided that justified time for extra

work shall be calculated on pro-rata basis as cost of extra work X stipulated period /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: WHEN CONTRACT CAN BE DETERMINED

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, any claims for damages 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 unworkman-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 work or has failed to proceed with the work with due diligence and continue to do so after a notice in writing of 7 days from the Engineer in charge.

iii. If the contractor fails to complete the work or section of work with individual date of completion on or before the stipulated or justified extended date, on or before such date of completion; and the Engineer in Charge without any prejudice to any other right or remedy under any other provision in the contract has given further reasonable time in a notice given in writing in that behalf as either mutually agreed or in absence of such mutual agreement by his own assessment making such time essence of contract and in the opinion of Engineer-in-Charge the contractor will be unable to complete the same or does not complete the same within the period specified.

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 within 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 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 forborne 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 agree 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 had secured the contract with Government as a result of wrong tendering or other non-bonafide method of competitive tendering or commits breach of integrity agreement.

viii. If the contractor being an 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 conveyance 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 contractor 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, (excluding part(s) of work assigned to other agency(s) by the contractor as per terms of contract), 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.

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 the contract as aforesaid so far as performance of work by the Contractor is concerned (of which determination notice in writing to the contractor under the hand of the Engineer-in-Charge shall be conclusive evidence). Upon such determination, the Earnest Money Deposit Security Deposit already recovered and Performance Guarantee under the contract shall be liable to be forfeited and shall be absolutely at the disposal of the 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 contractor to complete the work. The contractor, whose contract is determined 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: 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 or one month whichever is more, either party may close the contract by giving notice to the other party stating reasons. In such eventuality, the Performance Guarantee of the contractor shall be refunded within following time limits :

(I) If the Tendered value of work is up to Rs. 45 lac : 15 days.
(I) If the Tendered value of work is more than Rs. 45 lac and up to Rs. 2.5 Crore : 21 days.
(II) If the Tendered value of work exceeds Rs. 2.5 Crore : 30 Days

Neither party shall claim any compensation for such eventuality. This clause is not applicable for any breah of the contract by either party.

CLAUSE 4: CONTRACTOR LIABLE TO PAY COMPENSATION EVEN IF ACTION NOT TAKEN UNDER CLAUSE 3

In any case in which any of the powers conferred upon the Engineer-in-Charge by clause 3 thereof, shall have become exercisable and the same are not 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, clerk of the works, foreman or other authorized 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 expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the contractor.

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 notified by the Engineer-in-Charge, whichever is later. However, the handing over of site by the Engineer in Charge, in full or in part (if so provided in contract), shall be completed within two months from issue of acceptance letter. If the Contractor commits default in commencing the execution of the work as aforesaid, the performance guarantee shall be forfeited by the Engineer in Charge and shall be absolutely at the disposal of the Government without prejudice to any other right or remedy available in law.

5.1 As soon as possible but within twenty one days of award of work and in consideration of

a) Schedule of handing over of site as specified in the Schedule 'F'
b) Schedule of issue of designs as specified in the Schedule 'F'

(i) The Contractor shall submit a Time and Progress Chart for each milestone. The Engineer- in-Charge may within 30 days thereafter, if required modify, and communicate the program approved to the contractor failing which the program submitted by the contractor shall be deemed to be approved by the Engineer-in-Charge. The work programme shall include all details of balance drawings and decisions required to complete the contract with specific dates by which these details are required by contractor without causing any delay in execution of the work. 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 in Schedule 'F'.

ii) In case of non submission of construction programme by the contractor the programme approved by the Engineer-in-Charge shall be deemed to be final.

iii) The approval by the Engineer-in-Charge of such programme shall not relieve the contractor of any of the obligations under the contract.

iv) The contractor shall submit the Time and Progress Chart and progress report using the mutually agreed software or in other format decided by Engineer-in-Charge for the work done during previous month to the Engineer-in-charge on or before 5th day of each month failing which a recovery Rs. 2500/ - (for works costing upto Rs. 20 Crores) / Rs. 5000/- (for works costing more

than Rs. 20 Crores) shall be made on per week or part basis in case of delay in submission of the monthly progress report.

5.2. If the work(s) be delayed by:-

(i) force majeure, or
(i) abnormally bad weather, or
(ii) serious loss or damage by fire, or
(iii) civil commotion, local commotion of workmen, strike or lockout, affecting any of the trades employed on the work, or
(iv) delay on the part of other contractors or tradesmen engaged by Engineer-in-Charge in executing work not forming part of the Contract, or
(v) non-availability of stores, which are the responsibility of Government to supply or
(vi) non-availability or break down of tools and Plant to be supplied or supplied by Government or
(vii) any other cause like above which, in the reasoned opinion 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 for entry in the hindrance register (physical or web-based as prescribed in Schedule 'F' but shall nevertheless use constantly his best endeavours 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.

The contractor shall have no claim of damages for extension of time granted or rescheduling of milestone/s for events listed in sub clause 5.2.

5.3 In case the work is hindered by any reasons, in the opinion of the contractor, by the Department or for someone for whose action the Department is responsible, the contractor may immediately give notice thereof in writing to the Engineer-in-Charge in the same manner as prescribed under sub Clause 5.2 seeking extension of time or rescheduling of milestone/s. The authority as indicated in Schedule 'F' shall, if justified, give a fair and reasonable extension of time and reschedule the mile stones for completion of work after due consideration of the same within 30 days of receipt of such request. In event of non application by the contractor for extension of time E-in-C after affording opportunity to the contractor may give, supported with a programme, a fair and reasonable extension within a reasonable period of occurrence of the event. Such extension of time or rescheduling of milestone/s shall be without prejudice to any other right or remedy of the parties in contract or in law; provided further that for concurrent delays under this sub clause and sub clause 5.2 to the extent the delay is covered under sub clause 5.2 the contractor shall be entitled to only extension of time and no damages

5.4: Request for rescheduling of Mile stones or 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 forms i.e. Form of application by the contractor for seeking rescheduling of milestones (Appendix-XVI) or Form of application by the contractor for seeking extension of time (Appendix –XVII) respectively to the authority as indicated in Schedule 'F'. The Contractor shall indicate in such a request the period by which rescheduling of milestone/ s or extension of time is desired.

With every request for rescheduling of milestones, or if at any time the actual progress of work falls behind the approved programme by more than 10% of the stipulated period of completion of contract, the contractor shall produce a revised programme which shall include all details of pending drawings and decisions required to complete the contract and also the target dates by which these details should be available without causing any delay in execution of the work. A recovery as specified in Schedule 'F' shall be made on per day basis in case of delay in submission of the revised programme.

5.4.1 In any such case the authority as indicated in Schedule 'F' may give a fair and reasonable extension of time for completion of work or reschedule the mile stones. Such extension or rescheduling of the milestones shall be communicated to the Contractor by the authority as indicated in Schedule 'F' in writing, within 30 days of the date of receipt of such request from the Contractor in prescribed form. In event of non application by the contractor for extension of time E-in-C after affording opportunity to the contractor, may give, supported with a programme (as

specified under 5.4 above), a fair and reasonable extension within a reasonable period of occurrence of the event.

5.5 In case the work is delayed by any reasons, in the opinion of the Engineer-in-Charge, by the contractor for reasons beyond the events mentioned in clause 5.2 or clause 5.3 or clause 5.4 and beyond the justified extended date; without prejudice to right to take action under Clause 3, the Engineer-in-Charge may grant extension of time required for completion of work without rescheduling of milestones. The contractor shall be liable for levy of compensation for delay for such extension of time.

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 authorized 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 details description of the work expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications not withstanding 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: COMPUTERISED 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 check/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 overwriting in the measurements would thereafter be allowed. If at all any error 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 Division 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 charge, 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 not withstanding 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 maybe 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 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 7: PAYMENT ON INTERMEDIATE CERTIFICATE TO BE REGARDED AS ADVANCES

No payment shall be made for work, estimated to cost Rs. **One lac** 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. One lac, 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, 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 presentation of the bill by the Contractor to the Engineer-in-Charge or his Asstt. Engineer 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 any way 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 Asstt. 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 payment

Payment in composite contracts

In case of composite tenders, running payment for the major component shall be made by EE of major discipline to the main contractor. Running payment for minor component shall be made by the Engineer-in-Charge of the discipline of minor component directly to the main contractor.

In case main contractor fails to make the payment to the contractor associated by him within 15 days of receipt of each running account payment, then on the written complaint of contractor associated for such minor component, Engineer-in-Charge of minor component shall serve the show cause to the main contractor and if reply of main contractor either not received or found unsatisfactory, he may make the payment directly to the contractor associated for minor component, as per the terms and conditions of the agreement drawn between main contractor and associate contractor fixed by him. Such payment made to the associate contractor shall be recovered by Engineer-in-Charge of major or minor component from the next R/A/ final bill due to main contractor as the case may be.

CLAUSE 7A

No Running Account Bill shall be paid for the work till the applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable are submitted by the contractor to the Engineer-in-Charge.

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 off 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, colour 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-I internal) 2005 and (Part-ll 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 a sum of 0.1 % of Tendered Value or limit prescribed in Schedule F whichever is more as may be fixed by the Tender Inviting Authority concerned and in this respect the decision of the Chief Tender Inviting Authority shall be final and binding on the contractor.

The contractor shall submit completion plan for Internal and External Civil, Electrical and Mechanical Services within thirty days of the completion of the work, provided that the service plans having been issued for execution by the Engineer-in-Charge, unless the contractor, by virtue of any other provision in the contract, is required to prepare such plans.

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 hereinunder, 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. 45 lac : 2 months
(ii) If the Tendered value of work is more than Rs.45 lac and up to Rs. 2.5 Crore : 3 months
(iii) If the Tendered value of work exceeds Rs. 2.5 Crore : 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, registered financial, co-operative or thrift societies or recognized financial institutions instead of direct to him provided that the contractor furnishes to the Chief Executive,NRB (1) an authorization in the form of a legally valid document such as a power of attorney conferring authority on the bank; registered financial, co-operative or thrift societies or recognized financial institutions to receive payments and (2) his own acceptance of the correctness of the amount made out as being due to him by Government or his signature on the bill or other claim preferred against Government before settlement by the Engineer-in-Charge of the account or claim by payment to the bank, registered financial, co-operative or thrift societies or recognized financial institutions. While the receipt given by such banks; registered financial, co-operative or thrift societies or recognized financial institutions shall constitute a full and sufficient discharge for the payment, the contractor shall whenever possible present his bills duly receipted and discharged through his bank, registered financial, co-operative or thrift societies or recognized financial institutions.

Nothing herein contained shall operate to create in favour of the bank; registered financial, co-operative or thrift societies or recognized financial institutions any rights or equities visa- vis the President of India.

CLAUSE 10: MATERIALS SUPPLIED BY GOVERNMENT

Materials which Government will supply are shown in Schedule 'B' 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. Notwithstanding 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 the 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 authorized 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 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 account for contravention of the terms of the licences 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 materials 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 scheduled time for completion of the 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. The Engineer-in-Charge or his authorized 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.

The contractor shall at his own expense, provide a material testing lab at the site for conducting routine field tests. The lab shall be equipped at least with the testing equipment as specified in schedule F..

CLAUSE 10B:

i) SECURED ADVANCE ON NON-PERISHABLE MATERIALS

The contractor, on signing an indenture in the form in Annexure XVIII by the Engineer-in-Charge, shall be entitled to be paid during the progress of the execution of the work up to 75% 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 stored 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 advance 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.

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. Such advance shall be in two or more installments to be determined by the Engineer- in-Charge at his sole 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.

Before any installment of advance is released, the contractor shall execute a Bank Guarantee Bonds not more than 6 in number from Scheduled Bank for the amount equal to 110% of the amount of advance and valid for the period till recovery of advance. This (Bank Guarantee from Scheduled Bank for the amount equal to 110% of the balance amount of advance) shall be kept renewed from time to time to cover

the balance amount and likely period of complete recovery. Provided always that provision of Clause 10 B (ii) shall be applicable only when so provided in 'Schedule F'.

iii) PLANT MACHINERY AND 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% percent 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 of such old plant and equipment duly approved by a Registered Valuer 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 per cent of such amount of advance shall be paid after the plant & equipment is brought to site and balance twenty five percent on successfully commissioning the same.

Leasing of equipment shall be considered at par with purchase of equipment and shall be covered by 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 works;

and are in working order 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 beresponsible for maintaining such plant and equipment in good working order during the entire period of hypothecation failing 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 the insurer will be borne by the contractor.

iv) INTEREST AND RECOVERY

The mobilization advance and plant and machinery advance in (ii) & (iii) above bear simple interest at the rate of 10 per cent 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 contractors bills commencing after first ten per cent 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 per cent of the gross value of the contract is executed and paid, together with interest due on the entire outstanding amount up to the date of recovery of the installment.

v) INTEREST AND RECOVERY

If the circumstances are considered reasonable 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.

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

If after submission of the tender, if the price of any marital incorporated in the work (excluding the material covered under clause 10 CA and not been a material supply for a Engineer in charge's store in accordance with clause 10 thereof) and/or wages of labour increases as a direct result of the coming into force of any fresh law or statutory rule or order (but not due to any variation of rate in GST applicable on such material(s) being considered under this clause) beyond the prices/wages prevailing at the time of the last stipulated date of receipt of tenders including extensions, if any, for the work during contract period including the justified period extended under the provisions of clause 5 of the contract without any action under clause 2, then the amount of the contract shall accordingly be varied.

If after submission of the tender, the price of any material incorporated in the works (excluding the materials covered under Clause 10CA and not being a material supplied from the Engineer-in- Charge's stores in accordance with Clause 10 thereof) and/or wages of labour as prevailing at the time of last stipulated date of receipt of tender including extensions, if any, is decreased as a direct result of the coming into force of any fresh law or statutory rules or order (but not due to any changes of rate in sales tax/VAT, Central/State Excise/Custom Duty), Government shall in respect of materials incorporated in the works (excluding the materials covered under Clause 10CA and not being material supplied from the Engineer-in-Charge's stores in accordance with Clause 10 hereof) and/or labour engaged on the execution of the work after the date of coming into force of such law statutory rule or order be entitled to deduct from the dues of the contractor, such amount as shall be equivalent to the difference between the prices of the materials and/or wages as prevailed at the time of the last stipulated date for receipt of tenders including extensions if any for the work and the prices of materials and/or wages of labour on the coming into force of such law, statutory rule or order. This will be applicable for the contract period including the justified period extended under the provisions of clause 5 of the contract without any action under clause 2.

If after submission of the tender, the price of any material incorporated in the works (excluding the materials covered under Clause 10CA and not being a material supplied from the Engineer-in- Charge's stores in accordance with Clause 10 thereof) and/or wages of labour as prevailing at the time of last stipulated date of receipt of tender including extensions, if any, is decreased as a direct result of the coming into force of any fresh law or statutory rules or order (but not due to any changes of rate in sales tax/VAT, Central/State Excise/Custom Duty), Government shall in respect of materials incorporated in the works (excluding the materials covered under Clause 10CA and not being material supplied from the Engineer-in-Charge's stores in accordance with Clause 10 hereof) and/or labour engaged on the execution of the work after the date of coming into force of such law statutory rule or order be entitled to deduct from the dues of the contractor, such amount as shall be equivalent to the difference between the prices of the materials and/or wages as prevailed at the time of the last stipulated date for receipt of tenders including extensions if any for the work and the prices of materials and/or wages of labour on the coming into force of such law, statutory rule or order. This will be applicable for the contract period including the justified period extended under the provisions of clause 5 of the contract without any action under clause 2.

CLAUSE 10CA: **PAYMENT DUE TO VARIATION IN PRICES OF MATERIALS AFTER RECEIPT OF TENDER**

If after submission of the tender, the price of materials specified in Schedule F increases/decreases beyond the base price(s) as indicated in Schedule F 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 work done/during the justified period extended as above, it will be limited to indices prevailing at the time of updated stipulated date of completion considering the effect of extra work (extra time to be calculated on pro-rata basis only as cost of extra work x stipulated period/tendered cost).
The increase/decrease in prices of cement, steel reinforcement, structural steel and POL shall be determined by the all India Wholesale Price Indices of materials as published by the Economic Advisor to Government of India, Ministry of Commerce and Industry and base price for materials as mentioned in Schedule 'F'. In case, price index of a particular material is not issued by the Ministry of Commerce and Industry then the price Index of nearest similar material as indicated in Schedule 'F' shall be followed.
In case, price index of a particular material is not issued by Ministry of Commerce and Industry, then the price index of nearest similar material as indicated in Schedule 'F' shall be followed.
The amount of the contract shall accordingly be varied for all such materials and will be worked out as per the formula given below for individual material:
Adjustment for component of individual material

$$V = P \times Q \times \frac{(Cl - Clo)}{Clo}$$

Where,
V = Variation in material cost i.e. increase or decrease in the amount of rupees to be paid or recovered.
P = Base Price of material as issued under authority of DG, CPWD or concerned Zonal Chief Engineer and as indicated in Schedule "F".

For Projects and Original Works
Q = Quantity of material brought at site for bonafide use in the works since previous bill excluding any such quantity consumed in the deviated quantity of items beyond deviation limit and extra /substituted item, paid/to be paid at rates derived on the basis of market rate under clause 12.2.

For Maintenance Works
Q = Quantity of material brought at site for bonafide use in the works since previous bill including any such quantity consumed in the deviated quantity of items beyond deviation limit paid at agreement rate and extra /substituted item being scheduled items, but excluding non schedule extra /substituted item paid/to be paid at market rate under clause 12.2.

CIo = Price index for cement, steel reinforcement bars structural steel and POL as issued by the DG, CPWD and corresponding to the time of base price of respective material indicated in Schedule 'F'. For other items, if any, provided in Schedule 'F', All India Wholesale Price Index for the material as published by the Economic Advisor to Government of India, Ministry of Industry and Commerce and corresponding to the time of base price of respective material indicated in Schedule 'F'.
CI =Price index for cement, steel reinforcement bars, structural steel and POL as issued under the authority of DG, CPWD for period under consideration. For other items, if any, provided in Schedule 'F', All India Wholesale Price Index for the material for period under consideration as published by Economic Advisor to Government of India, Ministry of Industry and Commerce.

Note:
(i) 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 updated stipulated date of completion considering the effect of extra work (extra time to be calculated on prorata basis only as cost of extra work x stipulated period/tendered cost) shall be considered.
Provided always that provisions of the preceding Clause 10 C shall not be applicable

in respect of Materials covered in this Clause.

(ii) If during progress of work or at the time of completion of work, it is noticed that any material brought at site is in excess of requirement, then amount of escalation if paid earlier on such excess quantity of material shall be recovered on the basis of cost indices as applied at the time of payment of escalation or as prevailing at the time of effecting recovery, whichever is higher.

Cement mentioned wherever in this clause includes Cement component used in RMC brought at site from outside approved RMC plants, if any

(iv) The date wise record of ready mix concrete shall be kept in a register and the cement consumption for the same shall be calculated accordingly.

If built-up steel items are brought at site from workshop, then the variation shall be paid for the structural steel up to the period when the built up item/finished product is brought at site.

CLAUSE 10 (CC): PAYMENT DUE TO INCREASE / DECREASE IN PRICES / WAGES EXCLUDING MATERIALS COVERED UNDER 10 CA 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. 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.

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

(a)	Gross value of work done up to this quarter :	(A)
(b)	Gross value of work done up to the last quarter :	(B)
(c)	Gross value of work done since previous quarter (A-B)	(C)
(d)	Full assessed value of Secured Advance (excluding materials Covered under Clause 10 CA) fresh paid in this quarter :	(D)
(e)	Full assessed value of Secured Advance (excluding materials Covered under Clause 10 CA) recovered in this quarter :	(E)
(f)	Full assessed value of Secured Advance for which escalation 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(G-H):	(I)
(j)	Extra items/deviated quantities of items paid as per Clause 12 Based on prevailing market rates during this quarter:	(J)

Then, **M = C+F+I-J**

N = 0.85 M

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

(k) Less cost of services rendered at fixed charges as per Clause 34 and recovered during the quarter (L)

Cost of work for which escalation is applicable:

$$W = N - (K + L)$$

(ii) Components for materials (except cement, reinforcement bars, structural steel, POL or other materials covered under clause 10 CA) labour, etc. shall be pre-determined for every work and incorporated in the conditions of contract attached to the tender papers included in Schedule 'F'. The decision of the Engineer-in-Charge in working out such percentage shall be binding on the contractors.

(iii) The compensation for escalation for other materials (excluding cement, reinforcement bars, structural steel, POL or other materials covered under clause 10 CA) shall be worked as per the formula given below:-

Adjustment for civil component (except cement, structural steel, reinforcement bars, POL and other materials covered under clause 10CA) / electrical component of construction 'Materials'

$$Vm = W \times (Xm/100) \times (M1 - M1_o)/M1_o$$

Vm = Variation in material 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.

Xm = Component of 'materials' (except cement, structural steel, reinforcement bars POL and other materials covered under clause10CA) expressed as percent of the total value of work.

Ml = 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 Govt. 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 updated stipulated date of completion considering the effect of extra work (extra time to be calculated on prorata basis only as cost of extra work x stipulated period/ tendered cost, shall be considered.)

Ml_o = 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 valid on the last stipulated date of receipt of tender including extension, if any, as published by the Economic Advisor to Govt. of India, Ministry of Industry & Commerce and applying weightages to the Individual Commodities/Group items.

***Note:** relevant component only will be applicable.

(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 quarterly intervals and shall be with respect to the cost of work done as per bills paid during the three calendar months of the said quarter. The dates of preparation of bills as finally entered in the Measurement Book by the Assistant Engineer/ date of submission of bill finally by the contractor to the department in case of computerised measurement books shall be the guiding factor to decide the bills relevant to the quarterly interval. The first such payment shall be made at the end of three months after the month (excluding the month in which 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 the actual date of completion.

(b) The index (MI/FI etc.) relevant to any quarter/period for which such compensation is paid shall be the arithmetical 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 Ml and Fl shall be the average of the indices for the months falling within that period Xm.

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

$$VL = W \times (Y/100) \times (L1 - L1_0)/L1_0$$

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 percentage of the total value of the work.

L I : 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 updated stipulated date of Completion considering the effect of extra work (extra time to be calculated on prorata basis only as cost of extra work x stipulated period/ tendered cost, shall be considered.)

Ll_O : 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.

(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 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 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 variations in minimum wages of any category of labour, for the purpose of this clause, the variation in the rate for an unskilled 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 deductible from the cost of work under this contract and in this regard the formula herein before stated under this Clause 10CC 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 :

a) Where provisions of clause 10CC are applicable, provisions of clause 10C will not be applicable but provisions of clause 10CA will be applicable.

b) Where provisions of clause 10CC are not applicable, provisions of clause 10C and 10CA will become applicable.

Note: Updated stipulated date of completion (period of completion plus extra time for extra work for compensation under clause 10C, 10CA and 10CC

The factor of 1.25 taken into account for calculating the extra time under clause 12.1 for extra time shall not be considered while calculating the updated stipulated date of completion for this purpose in clause 10C, clause 10CA, and clause 10CC.

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 Government's 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 workmanlike manner 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 design, 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, designs, drawings and instructions as are not included in the standard specifications of NRB specified in Schedule 'F' or in any Bureau of Indian Standard or any other, published standard or code or, Schedule of Rates or any other printed publication 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 required for such execution and maintenance in so far as the necessity 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 substitutions for the original specifications, drawings, designs and instructions that may appear to him to be necessary or 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 or 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.

The completion cost of any agreement for Maintenance works including works of upgradation, aesthetic, special repair, addition/ alteration shall not exceed 1.25 times of Tendered amount.

Any further deviation beyond this limit up-to 1.5 times of tendered amount shall be approved by Chief Executive NRB through Tender Committee with recorded reason and in exceptional case, Chairman NRB through Board Meeting shall have full power to approve the deviation beyond 1.50 times of tendered amount with recorded reason and take suitable corrective action

12.1 The time for completion of the works 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, PRICING

A. For Project and original works:

In the case of extra item(s) (items that are completely new, and are in addition to the items contained in the contract), the contractor may within fifteen days of receipt of order or occurrence of the item(s) claim rates, supported by proper analysis, which shall include invoices, vouchers etc. and Manufacturer's specification for the work failing which the rate approved later by the Engineer- in- charge shall be binding and the Engineer-in-Charge shall within prescribed time limit 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,

B. For Maintenance works including works of upgradation, aesthetic, special repair, addition/ alteration:

In the case of Extra Item(s) being the schedule items (Delhi Schedule of Rates items), these shall be paid as per the schedule rate plus cost index (at the time of tender) plus/minus percentage above/ below quoted contract amount. Payment of Extra items in case of non-schedule items (Non-DSR items) shall be made as per the prevailing market rate

DEVIATION, SUBSTITUTED ITEMS, PRICING

A. For Project and original works:

In the case of substituted items (items that are taken up with partial substitution or in lieu of items of work in the contract), the rate for the agreement item (to be substituted) and substituted item shall also be determined in the manner as mentioned in the following para.

a.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 rates 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 rates of substituted item and the agreement item (to be substituted)

B. For Maintenance works including works of upgradation, aesthetic, special repair, addition/ alteration:

In the case of substitute Item(s) being the schedule items (Delhi Schedule of Rates items), these shall be paid as per the schedule rate plus cost index (at the time of tender) plus/minus percentage above/ below quoted contract amount. Payment of substitute items in case of non-schedule items (Non-DSR items) shall be made as per the prevailing market rate.

Deviations, Deviated quantities, Pricing:

A.In the case of contract items, substituted items, contract cum substituted items, which exceed the limits laid down in schedule F, the contractor may within fifteen days of receipt of order or occurrence of the excess, claim 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 prescribed time limit of 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.

B.For Maintenance works including works of upgradation, aesthetic, special repair, addition/ alteration:

In the case of contract items, which exceed the limits laid down in schedule F, the contractor shall be paid rates specified in the schedule of quantities.

The prescribed time limits for finalising rates for Extra Item(s), Substitute Item(s) and Deviated Quantities of contract items is within 30 days after submission of proposal by the contractor without observation of the Engineer-in-Charge.

12.3 A. For Project and original works:

The provisions of the preceding paragraph shall also apply to the decrease in the rates of items for the work in excess of the limits laid down in Schedule F, 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 for the work in question within one month of the expiry of the said period of fifteen days having regard to the market rates.

B. For Maintenance works including works of upgradation, aesthetic, special repair, addition/ alteration:

In case of decrease in the rates prevailing in the market of items for the work in excess of the limits laid down in Schedule F, 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 for 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 up to date account giving complete details of all claims for additional payments to which the contractor may consider himself entitled and of 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 Superintending Engineer may authorise 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 foundation unless & otherwise defined in the contract:

(i)For Buildings : All works up to 1.2 metres above ground level or up to floor 1 level whichever is lower.

(ii)For abutments, piers and well staining : All works up to 1.2 m above the bed level.

(iii)For retaining walls, wing walls, compound walls, chimneys, over head reservoirs/ tanks and other elevated structures : All works up to 1.2 metres above the ground level.

(iv)For reservoirs/tanks (other than overhead reservoirs/tanks) : All works up to 1.2 metres above the ground level.

(v)For basement: All works up to 1.2 m above ground level or up to floor 1 level whichever is lower.

(vi)For Roads, all items of excavation and filling including treatment of sub base.

12.6 Any operation incidental to or necessarily has to be in contemplation of tenderer while filing. tender, or 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 said 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 or during the progress of work, the purpose or object for which the work is being done changes due to any supervening cause and as a result of which the work has to be abandoned or reduced in scope the Engineer- in-Charge shall give notice in writing to that effect to the contractor stating the decision as well as the cause for such decision 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 utilized 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.

In the event of action being taken under Clause 13 to reduce the scope of work, the contractor may furnish fresh Performance Guarantee on the same conditions, in the same manner and at the same rate for the balance tendered amount and initially valid up to the extended date of completion or stipulated date of completion if no extension has been granted plus 60 days beyond that. Wherever such a fresh Performance Guarantee is furnished by the contractor the Engineer-in-Charge may return the previous Performance Guarantee.

CLAUSE 14: CARRYING OUT PART WORK AT RISK & COST OF CONTRACTOR

If contractor:

(i) At any time makes default during currency of work or does not execute any part of the work with due diligence and continues to do so even after a notice in writing of 7 days in this respect from the Engineer-in-Charge; or

(ii) Commits default in complying with any of the terms and conditions of the contract and does not remedy it or takes effective steps to remedy it within 7 days even after a notice in writing is given in that behalf by the Engineer-in-Charge; or

(iii) Fails to complete the work(s) or items of work with individual dates of completion, on or before the date(s) so determined, and does not complete them within the period specified in the notice given in writing in that behalf by the

Engineer-in-Charge.

The Engineer- in-Charge without invoking action under clause 3 may, without prejudice to any other right or remedy against the contractor which have either accrued or accrue thereafter to Government, by a notice in writing to take the part work / part incomplete work of any item(s) out of his hands and shall have powers to:

(a) Take possession of the site and any materials, constructional plant, implements, stores, etc., thereon; and/or

(b) Carry out the part work / part incomplete work of any item(s) by any means at the risk and cost of the contractor.

The Engineer-in-Charge shall determine the amount, if any, is recoverable from the contractor for completion of the part work/ part incomplete work of any item(s) taken out of his hands and execute at the risk and cost of the contractor, the liability of contractor on account of loss or damage suffered by Government because of action under this clause shall not exceed 10% of the tendered value of the work.

In determining the amount, credit shall be given to the contractor with the value of work done in all respect in the same manner and at the same rate as if it had been carried out by the original contractor under the terms of his contract, the value of contractor's materials taken over and incorporated in the work and use of plant and machinery belonging to the contractor. The certificate of the Engineer-in-Charge as to the value of work done shall be final and conclusive against the contractor provided always that action under this clause shall only be taken after giving notice in writing to the contractor. Provided also that if the expenses incurred by the department are less than the amount payable to the contractor at his agreement rates, the difference shall not be payable to the contractor.

Any excess expenditure incurred or to be incurred by Government in completing the part work/ part incomplete work of any item(s) or the excess loss of damages suffered or may be suffered by Government as aforesaid after allowing such credit shall without prejudice to any other right or remedy available to Government in law or per as agreement be recovered from any money due to the contractor on any account, and if such money is insufficient, the contractor shall be called upon in writing and shall be liable to pay the same within 30 days.

If the contractor fails to pay the required sum within the aforesaid period of 30 days, the Engineer-in-Charge shall have the right to sell any or all of the contractors' unused materials, constructional plant, implements, temporary building at site etc. and adjust the proceeds of sale thereof towards the dues recoverable from the contractor under the contract and if thereafter there remains any balance outstanding, it shall be recovered in accordance with the provisions of the contract.

In the event of above course being adopted by the Engineer-in-Charge, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any engagements or made any advance on any account or with a view to the execution of the work or the performance of the contract.

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 or 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 reason (a) in subpara (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 has 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, as 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 3months.

CLAUSE 15A: COMPENSATION IN CASE OF DELAY OF SUPPLY OF MATERIAL BY GOVT

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 the difficulties relating to the supply of wagons, force majeure or any reasonable cause beyond the control of the Government.

This clause 15 A will not be applicable for works where no material is stipulated.

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 authorized 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 authorized subordinates in-charge of the work or to the Chief Engineer in charge of Quality Assurance or his subordinate officers or the officers of the organization engaged by the Department for 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. 10 Lac 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 authority specified in 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 LIABILE 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 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 twelve months (six months in the case of work costing Rs. Ten lacs 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 twelve months (six months in the case of work costing Rs. Ten lacs 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 liabilities of the contractor under this contract, half of the security deposit will be refundable after six months and the remaining half after twelve months of the issue of the said certificate of completion or till the final bill has been prepared and passed whichever is later.

In case of Maintenance and Operation works 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 ETC.

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 to this, appliances, implements, other plants, ladders, cordage, tackle, scaffolding and temporary works required for the proper execution of the work, whether original, altered or substituted and whether included in the specifications 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 the measurement for 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 this contract or otherwise and/or from his security deposit or the proceeds of sale thereof, or of a sufficient portions thereof.

CLAUSE 18A: RECOVERY OF COMPENSATION PAID TO WORKMEN

In every case in which by virtue of the provisions sub-section (1) of Section 12, 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 sub-section (2) of Section 12, of 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 sub-section (1) of Section 12, of 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

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 Contractor's Labour Regulations/ Act, 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 Sub-Section (2) of Section 20, and Sub-Section (4) of Section 21, 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 Sub-Section (1) of Section 20, and Sub-Section (4) of section 21, 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 licence 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 comply with provisions of the Inter-State Migrant

Workmen (Regulation of Employment and Conditions of Service) Act, 1979.

The contractor shall also abide by the provisions of the Child Labour (Prohibition and 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 fulfil 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 14 YEARS

No labour below the age of fourteen years shall be employed on the work.

CLAUSE 19B: FAIR WAGE CLAUSE (PAYMENT OF WAGES)

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 contracts, 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 the labourers 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 holidays to any labourers, and pay the same to the persons entitled thereto from any money due to the contractor by the Engineer-in-Charge concerned. In the case of Union Territory of Delhi, however, as the all inclusive minimum daily wages fixed under Notification of the Delhi Administration No.F.12 (162) MWO/DAB/43884-91, dated 31-12-1979 as amended from time to time are inclusive of wages for the weekly day of rest, the question of extra payment for weekly holiday would not arise.

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 and keep indemnified 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 laws 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 wage for the time being, or if the wage payable is higher than such wage, such wage shall be paid by the contractor to the workmen directly without the intervention of Jamadar and that Jamadar shall not be entitled to deduct or recover any amount from the minimum wage payable to the workmen 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 workmen.

CLAUSE 19C: SAFETY 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 BARC 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: SUBMISSION OF LABOUR CHART BY EVERY FORTNIGHT

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 19F 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 Divisional Officer 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 SANITATION ARRANGEMENT FOR WORKERS

In respect of all labour directly or indirectly employed in the works for the performance of the contractor's part of this contract, 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 NRB-BARC and its contractors

CLAUSE 19F: MATERNITY BENEFIT RULES FOR FEMALE WORKERS EMPLOYED BY CONTRACTOR

Leave and pay during leave shall be regulated as follows:-

1.Leave :

(i) in the case of delivery - maternity leave not exceeding 8 weeks, 4 weeks up to 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 total wages earned on the days when full time work was done during a period of three months immediately preceding the date on which she gives notice that she expects to be confined or at the rate of Rupee one only a day whichever is greater.

(ii) in the case of miscarriage - leave pay at the rate of average daily earning calculated on the total wages earned on the days when full time work was done during a period of three 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 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 in appendix -I and II, and the same shall be kept at the place of work.

Appendix-I

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

Date on which maternity leave commenced and ended

Date of delivery / miscarriage	In case of Commenced	Delivery Ended	In case of Commenced	Mis-carriage Ended
6	7	8	9	10

Leave pay paid to the employee

In case of delivery			In case of mis-carriage	
Rate of leave pay	Amount paid	Rate of leave pay	Amount paid	Remarks
11	12	13	14	15

Appendix-II

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: PENALTY FOR NON-COMPLIANCE OF LABOUR REGULATIONS

In the event of the contractor(s) committing a default or breach of any of the provisions of the Central Public Works Department, Contractor's Labour Regulations and Model Rules 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, filing 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 per cent 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 provisions of the DAE Contractor's Labour Regulations and 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 within 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/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 hereinbefore mentioned at the cost of the contractor(s).

The contractor(s) shall erect, make and maintain at his/their own expense 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 remodelled and/or reconstructed according to approved standards, 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: PROVIDING HUTMENTS, W/S, S/I, DRAINAGE, SANITATIONS ETC FOR WORKERS

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.

(i) (a) The minimum height of each hut at the eaves level shall be 2.10m (7 ft.) and the floor area to be provided will be at the rate of 2.7 sq.m. (30 sq.ft.) 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 1.80m x 1.50m (6'x5') 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.

(ii) (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 kutcha but plastered with mud gobri and shall be at least 15 cm (6") 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 7.2m (8 yards) between the rows of huts which may be reduced to 6m (20 ft.) according to the availability of site with the approval of the Engineer-in-Charge. Back to back construction will be allowed.

(iii) Water Supply - The contractor(s) shall provide adequate supply of water for the use of labourers. The provisions shall not be less than two gallons of pure and wholesome water per head per day for drinking purposes and three gallons 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 river, 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.

(iv)The site selected for the camp shall be high ground, removed from jungle.

(v) 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 eight seats in case of dry system.

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

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

(viii)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: REMOVAL OF INCOMPETENT WORKERS

The Engineer-in-Charge may require the contractor to dismiss or remove from the site of the work any person or persons in thecontractors' employ upon the work who may be incompetent or misconduct himself and the contractor shall forthwith comply with such requirements. In respect of maintenance/repair or renovation works etc. where the labour have an easy access to the individual houses, the contractor shall issue identity cards to the labourers, whether temporary or permanent and he shall be responsible for any untoward action on the part of such labour. AE/JE will display a list of contractors working in the colony/Blocks on the notice board in the colony and also at the service centre, to apprise the residents about the same.

CLAUSE 19 J: NO PART OF BUILDING TO BE OCCUPIED - ACTION ON BREACH THEREOF

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

However, the Tender Inviting Authority, through a notice, may require the contractor to remove the illegal occupation any time on or before construction and delivery

CLAUSE 19 K: 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 19 K: Contribution of EPF and ESI

The ESI and EPF contributions on the part of employer in respect of this contract shall be paid by the contractor. These contributions on the part of the employer paid by the contractor shall be reimbursed by the Engineer-in-Charge to the contractor on actual basis.

The applicable and eligible amount of EPF&ESI shall be reimbursed preferably within 7 days but not later than 30 days of submission of documentary proof of payment provided same are in order.

CLAUSE 20: MINIMUM WAGES ACT TO BE COMPILED WITH

The contractor shall comply with all the provisions of the Minimum Wages Act, 1948, and Contract Labour (Regulation and Abolition) Act, 1970, amended from time to

time and rules framed thereunder and other labour laws affecting contract labour that may be brought into force from time to time.

CLAUSE 21: WORK NOT TO BE SUB-LET. ACTION IN CASE OF INSOLVENCY

The contract shall not be assigned or sublet without the written approval of the Engineer-in - Charge. And if the contractor shall assign or sublet his contract, or attempt to do so, or become insolvent or commence any insolvency proceedings or make anycomposition 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 course specified in Clause 3 hereof in the interest of Government and in the event of such course being adopted, the consequences specified in the said Clause 3 shall ensue.

CLAUSE 22: SUMS PAYABLE BY WAY OF COMPENSATION

All sums 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 works 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 consequences shall ensue as provided in the said Clause 21.

CLAUSE 24: All works to be executed 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 or if the Engineer-in-Charge considers any act or decision of the contractor on any matter in connection with or arising out of the contract or carrying out of the work, to be unacceptable and is disputed, such party shall promptly within 15 days of the arising of the disputes request the Chief Executive, NRB who shall refer the disputes to Dispute Reressal Committee (DRC) within 15 days along with a list of disputes with amounts claimed if any in respect of each such dispute. The Dispute Redressal Committee (DRC) shall give the opposing party two weeks for a written response, and, give its decision within a period of 60 days extendable by 30 days by consent of both the parties from the receipt of reference from Chief Executive, NRB. The constitution of Dispute

Redressal Committee (DRC) shall be as indicated in Schedule 'F'. Provided that no party shall be represented before the Dispute Redressal Committee by an advocate/legal counsel etc.

If the Dispute Redressal Committee (DRC) fails to give its decision within the aforesaid period or any party is dissatisfied with the decision of Dispute Redressal Committee (DRC) or expiry of time limit given above, then either party may within a period of 30 days from the receipt of the decision of Dispute Redressal Committee (DRC), give notice to the Chairman, NRB for appointment of arbitrator on prescribed proforma as per Appendix XV under intimation to the other party failing which they said decision shall be final binding and conclusive and not referable to adjudication by the arbitrator.

It is a term of contract that each party invoking arbitration must exhaust the aforesaid mechanism of settlement of claims/disputes prior to invoking arbitration. The Chief Executive NRB/Chairman NRB shall in such case appoint the sole arbitrator or one of the three arbitrators as the case may be within 30 days of receipt of such a request and refer such disputes to arbitration. Wherever the Arbitral Tribunal consists of three Arbitrators, the contractor shall appoint one arbitrator within 30 days of making request for arbitration or of receipt of request by Engineer-in-Charge to Chief Executive NRB/Chairman NRB for appointment of arbitrator, as the case may be, and two appointed arbitrators shall appoint the third arbitrator who shall act as the Presiding Arbitrator. In the event of

a. A party fails to appoint the second Arbitrator, or
b. The two appointed Arbitrators fail to appoint the Presiding Arbitrator, then The Chairman NRB shall appoint the second or Presiding Arbitrator as the case may be.

(ii) Disputes or difference shall be referred for adjudication through arbitration by a Tribunal having sole arbitrator where Tendered amount is Rs. 100 Crore or less. Where Tendered Value is more than Rs. 100 Crore, Tribunal shall consist of three Arbitrators as above.

The requirements of the Arbitration and Conciliation Act, 1996 (26 of 1996) and any further statutory modifications or re- enactment thereof and the rules made there under and for the time being in force shall be applicable.

It is a term of this contract that the party invoking arbitration shall give a list of disputes with amounts claimed, if any, in respect of each such dispute along with the notice for appointment of arbitrator and giving reference to the decision of the DRC.

It is also a term of this contract that any member of the Arbitration Tribunal shall be a Graduate Engineer with experience in handling public works engineering contracts at a level not lower than Chief Engineer (Joint Secretary level of Government of India). This shall be treated as a mandatory qualification to be appointed as arbitrator. Parties, before or at the time of appointment of Arbitral Tribunal may agree in writing for fast track arbitration as per the Arbitration and Conciliation Act, 1996 (26 of 1996) as amended in 2015. Subject to provision in the Arbitration and Conciliation Act, 1996 (26 of 1996) as amended in 2015 whereby the counter claims if any can be directly filed before the arbitrator without any requirement of reference by the appointing authority, 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 as per the Act.

The place of arbitration shall be as mentioned in Schedule 'F'. In case there is no mention of place of arbitration, the arbitral tribunal shall determine the place of arbitration.

The venue of the arbitration shall be such place as may be fixed by the Arbitral Tribunal in consultation with both the parties. Failing any such agreement, then the Arbitral Tribunal shall decide the venue.

CLAUSE 26: CONTRACTOR TO INDEMNIFY GOVT. AGAINST PATENT RIGHTS

The contractor shall fully indemnify and keep indemnified 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 or 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 if 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: LUMP SUM PROVISION IN TENDER

When the estimate on which a tender is made includes lump sum 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 tems, 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 class of work for which there is no such specifications as referred to in Clause 11, such work shall be carried out in accordance with the Bureau of Indian Standards Specifications. In case, there are no such specifications in Bureau of Indian Standards, the work shall be carried out as per manufacturers' specifications, if not available then as per District Specifications. In case there are no such specifications as required above, the work shall be carried out in all respects in accordance with the instructions and requirements of the Engineer-in-Charge..

CLAUSE 29: WITH HOLDING AND LIEN IN RESPECT OF SUMS DUE FROM CONTRACTOR

(i) Whenever any claim or claims for payment of a sum of money arises out of or under the contract or against the contractor, the Engineer-in-Charge or 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 may at any time thereafter become payable to the contractor under the same contract or any other contract with the Engineer-in-Charge of the Government or any contracting person through the Engineer-in-Charge pending finalization of adjudication of any such claim.

It is an agreed term of the contract that the sum of money or moneys 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.

(ii) 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 is found to have been overpaid in respect of any work done by the contractor under the contract or any work claimed 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 (i) 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, without any interest thereon whatsoever. Provided that the Government shall not be entitled to recover any sum overpaid, 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 term of the contract permitting payment for work after assessment by the Project Director or the Engineer-in-Charge.

CLAUSE 29A: **LIEN IN RESPECT OF CLAIMS IN OTHER CONTRACTS**

Any sum of money due and payable to the 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 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 damages 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 –

The contractor shall not employ coal mining or controlled area labour falling under any category whatsoever on or in connection with the work or recruit labour from area within a radius of 32 km (20 miles) of the controlled area. Subject as above the contractor shall employ imported labour only i.e., deposit imported labour or labour imported by contractors from area, from which import is permitted.

Where ceiling price for imported labour has been fixed by State or Regional Labour Committees not more than that ceiling price shall be paid to the labour by the contractor. The contractor shall immediately remove any labourer who may be pointed out by the Engineer-in-Charge as being a coal mining or controlled area labourer. Failure to do so shall render the contractor liable to pay to Government a sum calculated at the rate of Rs.10/- per day per labourer. The certificate of the Engineer-in-Charge about the number of coal mining or controlled area labourer and the number of days for which they worked shall be final and binding upon all parties to this contract.

It is declared and agreed between the parties that the aforesaid stipulation in this clause is one in which the public are interested within the meaning of the exception in Section 74 of Indian Contract Act, 1872.

Explanation:- Controlled Area means the following areas:

Districts of Dhanbad, Hazaribagh, Jamtara - a Sub-Division under Santhal Pargana Commissionery, Districts of Bankuara, Birbhum, Burdwan, District of Bilaspur. Any other area which may be declared a Controlled Area by or with the approval of the Central Government..

CLAUSE 31: SUPPLY OF UNFILTERED WATER

The contractor(s) shall make his/their own arrangements for 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.

(i) 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 31A: DEPARTMENTAL WATER SUPPLY, IF AVAILABLE

Water if available may be supplied to the contractor by the department subject to the following conditions :

(i) The water charges @ 1 % shall be recovered on gross amount of the work done.

(i) The contractor(s) shall make his/their own arrangement of water connection and laying of pipelines from existing main of source of supply.

(ii) 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 break down 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 break down.

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 for which the hand pumps and wells are intended. He will also be responsible for all damages 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.

(i) 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 recovered from the contractor on this account, but the contractor shall be required to provide necessary safety arrangements to avoid any accidents or damages to adjacent buildings, roads and service lines. He shall be responsible for any accidents or damages caused due to construction 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 -ACTION TO BE TAKEN

Notwithstanding anything contained to the contrary in 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 licences 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 written 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. 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 licence 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

(i) The contractor shall arrange at his own expense all tools, plant, machinery and equipment (hereinafter referred to as T&P) required for execution of the work except for the Plant & Machinery listed in Schedule 'C' and stipulated for issue to the contractor. If the contractor requires any item of T&P on hire from the T&P available with the Government over and above the T&P stipulated for issue, the Government will, if such item is available, to the contractor at rates to be agreed upon between him and the Engineer-in-Charge. In such a case, all the conditions hereunder for issue of T&P shall also be applicable to such T&P as is agreed to be issued.

(i) Plant and Machinery when supplied on hire charges shown in Schedule 'C' shall be made over and taken back at the departmental equipment yard/shed shown in Schedule 'C' and the contractor shall bear the cost of carriage from the place of issue to the site of work and back. The contractor shall be responsible to return the plant and machinery with condition in which it was handed over to him, and he shall be responsible for all damage caused to the said plant and machinery at the site of work or elsewhere in operation and otherwise during transit including damage to or loss of plant and for all losses due to his failure to return the same soon after the completion of the work for which it was issued. The Divisional Engineer shall be the sole judge to determine the liability of the contractor and its extent in this regard and his decision shall be final and binding on the contractor.

(ii) The plant and machinery as stipulated above will be issued as and when available and if required by the contractor. The contractor shall arrange his programme of work according to the availability of the plant and machinery and no claim, whatsoever, will be entertained from him for any delay in supply by the Department.

(iii) The hire charges shall be recovered at the prescribed rates from and inclusive of the date the plant and machinery made over upto and inclusive of the date of the return in good order even though the same may not have been working for any cause except major breakdown due to no fault of the contractor or faulty use requiring more than three working days continuously (excluding intervening holidays and Sundays) for bringing the plant in order. The contractor shall immediately intimate in writing to the Engineer-in-Charge when any plant or machinery gets out of order requiring major repairs as aforesaid. The Engineer-in-Charge shall record the date and time of receipt of such intimation in the log sheet of the plant or machinery. Based on this, if the breakdown before lunch period or major breakdown will be computed considering half a day's breakdown on the day of complaint. If the breakdown occurs in the post lunch period of major breakdown will be computed starting from the next working day. In case of any dispute under this clause, the decision of the Superintending Engineer shall be final and binding on the contractor.

(iv) The hire charges shown above are for each day of 8 hours (inclusive of the one hour lunch break) or part thereof.

(v) Hire charges will include service of operating staff as required and also supply of lubricating oil and stores for cleaning purposes. Power fuel of approved type, firewood, kerosene oil etc. for running the plant and machinery and also the full time chowkidar for guarding the plant and machinery against any loss or damage shall be arranged by the contractor who shall be fully responsible for the safeguard and security of plant and machinery. The contractor shall on or before the supply of plant and machinery sign an agreement indemnifying the Department against any loss or damage caused to the plant and machinery either during transit or at site of work.

(vi) Ordinarily, no plant and machinery shall work for more than 8 hours a day inclusive of one hour lunch break. In case of an urgent work however, the Engineer-in-Charge may, at his discretion, allow the plant and machinery to be worked for more than normal period of 8 hours a day. In that case, the hourly hire charges for overtime to be borne by the contractor shall be 50% more than the normal proportionate hourly charges (1/8th of the daily charges) subject to a minimum of half day's normal charges on any particular day. For working out hire charges for over time, a period of half an hour and above will be charged as one hour and a period of less than half an hour will be ignored.

(vii) The contractor shall release the plant and machinery every seventh day for periodical servicing and/or wash out which may take about three to four hours or more. Hire charges for full day shall be recovered from the contractor for the day of servicing/ wash out irrespective of the period employed in servicing.

(viii) The plant and machinery once issued to the contractor shall not be returned by him on account of lack of arrangements of labour and materials, etc. on his part, the same will be returned only when they are required for major repairs or when in the opinion of the Engineer-in-Charge, the work or a portion of work for which the same was issued is completed.

(ix) Log Book for recording the hours of daily work for each of the plant and machinery supplied to the contractor will be maintained by the Department and will be countersigned by the contractor or his authorized agent daily. In case the contractor contests the correctness of the entries and/or fails to sign the Log Book, the decision of the Engineer- in-Charge shall be final and binding on him. Hire charges will be calculated according to the entries in the Log Book and will be binding on the contractor. Recovery on account of hire charges for road rollers shall be made for the minimum number of days worked out on the assumption that a roller can consolidate per day and maximum quantity of materials or area surfacing as noted against each in the annexed statement (see attached annexure).

(x) In the case of concrete mixers, the contractors shall arrange to get the hopper cleaned and the drum washed at the close of the work each day or each occasion.

(a) In case, rollers for consolidation are employed by the contractor himself, log book for such rollers shall be maintained in the same manner as is done in case of departmental rollers, maximum quantity of any items to be consolidated for each roller-day shall also be same as in Annexure to Clause 34(x). For less use of rollers, recovery for the less roller days shall be made at the stipulated issue rate.

(xii) The contractor shall be responsible to return the plant and machinery in the condition in which it was handed over to him and he shall be responsible for all damage caused to the said plant and machinery at the site of work or elsewhere in operation or otherwise or during transit including damage to or loss of parts, and for all losses due to his failure to return the same, soon after the completion of the work, for which it was issued. The Divisional Engineer shall be the sole judge to determine the liability of the contractor and its extent in this regard and his decision shall be final and binding on the contractor.

(xiii) The contractor will be exempted from levy of any hire charges for the number of days he is called upon in writing by the Engineer-in-Charge to suspend execution of the work, provided Government plant and machinery in question have, in fact, remained idle with the contractor because of the suspension

(xiv)In the event of the contractor not requiring any item of plant and machinery issued by Government though not stipulated for issue in Schedule 'C' any time after taking delivery at the place of issue, he may return it after two days written notice or at any time without notice if he agrees to pay hire charges for two additional days without, in any way, affecting the right of the Engineer-in-Charge to use the said plant and machinery during the said period of two days as he likes including hiring out to a third party.

CLAUSE 35: CONDITION RELATING TO USE OF ASPHALTIC MATERIALS

(i) The contractor undertakes to make arrangement for the supervision of the work by the firm supplying the tar or bitumen used.

(i) The contractor shall collect the total quantity of tar or bitumen required for the work as per standard formula, before the process of painting is started and shall hypothecate it to the Engineer-in-Charge. If any bitumen or tar remains unused on completion of the work on account of lesser use of materials in actual execution for reasons other than authorized changes of specifications and abandonment of portion of work, a corresponding deduction equivalent to the cost of unused materials as determined by the Engineer-in-Charge shall be made and the material return to the contractors. Although the materials are hypothecated to Government, the contractor undertakes the responsibility for their proper watch, safe custody and protection against all risks. The materials shall not be removed from site of work without the consent of the Engineer-in-Charge in writing.

(ii) The contractor shall be responsible for rectifying defects noticed within a year from the date of completion of the work and the portion of the security deposit relating to asphaltic work shall be refunded after the expiry of this period.

CLAUSE 36: EMPLOYMENT OF TECHNICAL STAFF AND EMPLOYEES

Contractors Superintendence, Supervision, Technical Staff & Employees

(i) The contractor shall provide all necessary superintendence during execution of the work and all 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(s), qualifications, experience, age, address(s) 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 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(s) 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(s) 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 start of 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 take instructions. Instructions given to the principal technical representative or other technical 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 or his 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(s) is/are effectively appointed or is/are effectively attending or 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 checked/test checked in Measurement Books shall be final and binding on the contractor. Further if the contractor fails to appoint suitable technical Principal technical representative and/or other technical representative(s) 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 suitable other technical representative(s) is/are appointed and the contractor shall be held responsible for the delay so caused to the work. The contractor shall submit a certificate of employment of the technical representative(s) (in the form of copy of Form-16 or CPF deduction issued to the Engineers employed by him) along with every on account bill final bill and shall produce evidence if at any time so required by the Engineer-in-Charge.

(ii) 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 labour 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.

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 any tax, levy or cess applicable on last stipulated date of receipt of tender including extension if any. No adjustments 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 further that 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 increase 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 this 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 shall also furnish such other information/document as the Engineer-in-Charge may require from time to time.

The contractor shall, within a period of 30 days of the imposition of any such further tax or levy or cess, 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 Divisional Officer 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 Nuclear Recycle Board (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 Scientific Assistant (Both inclusive). 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 Nuclear Recycle Board. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.

NOTE : By the term 'near relative' is meant wife, husband, parents and grandparents, children and grandchildren, 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 shall work as a contractor or employee of a contractor for a period of one year after his retirement from government service without the previous permission of Government of India in writing. 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 contractor's service, as the case may be.

CLAUSE 42: RETURN OF MATERIAL & RECOVERY FOR EXCESS MATERIAL 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 & bitumen shall be calculated on the basis of quantity of cement & 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 & category wise.

(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 non 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 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 warlike operation, the contractor shall when ordered (in writing) by the Engineer-in-Charge to 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 material and for reconstruction of all works ordered by the Engineer-in-Charge, such payments being in addition to compensation upto 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 Divisional Officer upto Rs.5,000/- and by the Superintending Engineer concerned for a higher amount. The contractor shall be paid for the damages/destruction suffered and for restoring the material at the rate based on analysis of rates tendered for in accordance with the provision of the contract. 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 warlike 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 material etc. not on the site of the work or for any tools, plant, machinery, scaffolding, temporary building 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 Divisional Officer..

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 Executive NRB 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: RELEASE OF SECURITY DEPOSIT AFTER LABOUR CLEARANCE

Release of Security Deposit of the work shall not be refunded till the contractor produces a clearance certificate from the Labour Officer. As soon as the work is virtually complete, the contractor shall apply for the clearance certificate to the

Labour Officer under intimation to the Engineer-in-Charge. The Engineer-in-Charge, on receipt of the said communication, shall write to the Labour Officer to intimate if any complaint is pending against the contractor in respect of the work. If no complaint is pending, on record till after 3 months after completion of the work and/or no communication is received from the Labour Officer to this effect till six months after the date of completion, it will be deemed to have received the clearance certificate and the Security Deposit will be released if otherwise due.

III (3) - SAFETY CODE

Refer construction safety manual available at www.barc.gov.in website in addition to followings:

1. INTRODUCTION

Many of the works of Department of Atomic Energy as its various sites are expected by the contractors. During these work, contractor's personnel are likely to be exposed to different types of hazards. Similarly, unsafe acts of contractor's personnel may generate hazards for Departmental staff and/or workmen of other contractor are working at the site. Such unsafe acts may also pose danger to the existing installation and even to members of public. This guide is prepared to facilities safe working during execution of contract works. The safety measures given below are to be taken by the contractor during the executing of work. However, no claims on account of observing the additional safety precautions shall be entertained by the department. The intending tenderers are requested to quote their rates accordingly keeping in mind the safety guidelines.

2. GENERAL SAFETY PROVISIONS

2.1 The contractor shall take all safety precautions during the execution of awarded work and shall maintain and leave the site safe at all times. At the end of each working day and at all times when the work is temporarily suspended he shall ensure that all materials, equipment and facilities will not cause damage to existing property, personal injury or interference with the other works of the Project or Station. The contractors shall comply with all applicable provisions of the safety regulations cleanup programme and other measures that are in force at the site.

2.2 The contractor shall provide and maintain all lights, guards, fencing; warning signs caution boards and other safety measures and provide for vigilance as and where necessary or as required by the Engineer-in-Charge or by duly constituted authority for the protection of workers or for the safety of others. The caution boards shall also have appropriate symbols.

2.3 Adequate lighting facilities such as floodlights, hand area lighting shall be provided by the contractor at the site of work, storage area of material and equipment and temporary access roads within his working area. The contractor shall obtain written approval of the Engineer-in-charge to the lighting scheme and place of tapping prior to its installation.

2.4 The contractor shall plan his operations so as to avoid interference with the other departmental works, other contractors or sub-contractors at site. In case of any interference, the contractor shall seek necessary co-ordination from the department for safe and smooth working.

2.5 The contractor and his sub-contractor, is any shall comply with the instructions given by the Safety Engineer or his authorized nominee regarding safety precautions, protective measures, house keeping requirements, etc. The safety Engineer with due intimation to engineer-in-charge shall have the right to stop the work of the contractor, if in his opinion proceeding with the work will lead to an unsafe and dangerous condition. Engineer-in-

charge shall get the unsafe condition removed or provide protective equipment at the contractors cost. The contractor can employ his own Safety Engineer for ensuring compliance of all safety rules. Contractor shall ensures that all his workmen are aware about the nature of risk involved in their work and have adequate training for carrying out their work safety.

2.6 The contractor shall be held responsible for non-compliance of any the safety measures and delays, implication, injuries, facilities and compensation arising out of such situations or incidents.

3. TRAFFIC

3.1 The contractors shall conduct his operations so as to interface as little as possible with the use of existing roads at near locations where the work is being performed.

3.2 When interface to traffic is inevitable, notice of such interference shall be given to the Engineer-in-charge well in advance (at least 48 hours) with the details of start of the work and time required, storage of material and details of the proposed methods of providing the required facilities for safe and continuous of roads and obtain his clearance.

3.3 The contractor shall at his own expense make such approved temporary provision as are required to maintain at least of traffic by bridging the excavation providing ramps over surface obstructions or providing suitable temporary bye-pass around the obstructions. The contractor shall exercise full acre ensure that no damage is caused by him or his workmen, during the operation to the existing water supply, sewerage, power or telecommunication lines or any other services or works. The contractor shall be required to provide and erect before construction, substantial barricades, guardrails, and warning signs. He shall furnish place and maintain adequate warning lights, signals, etc. as required by Engineer-in-charge.

4. SAFE MEANS OF ACCESS

4.1 Adequate and safe means of access and exist shall be provide for all work places, at all elevations. Using of scaffolding members (avoiding a ladder) for approach to high elevations shall not be permitted.

4.2 Suitable scaffolds shall be provide for workmen for all works that cannot safely be done from the ground, or from solid construction except such short duration work as can be done safely from ladders. Ladder shall be of rigid construction having sufficient strength for the intended load and made either of good quality wood or metal and all ladders shall be maintained well for safe working condition, and extra labourer shall be engaged for holding the ladder if ladder is not securely fixed. If the ladder is used for carrying material as well, suit able footholds and handholds shall be provided on the ladder. The ladder shall be given an inclination not steeper than 1 in 4 (1horizontal and 4 vertical). Ladders shall not be used for climbing carrying material in hands. While climbing both the hands shall be free.

4.3 Scaffolding or staging more than 3.5m above the ground or floor, swung or suspected from an overhead support or erected with or erected with stationery support shall have a standard guard rail properly attached bolted, braced or otherwise secured at least 1.0m high above the floor or platform of such scaffolding or staging. The guardrail shall extend along the entire exposed length of the scaffolding with only such opening as may be necessary for the delivery of material. Standard railing shall have posts not more 2m apart and an intermediate rail halfway between the floor or platform of the scaffolding and the top the rail. Such scaffolding or staging shall be so fastened as or prevent it from swaying from the building or structure Scaffolding and ladder shall conform to relevant IS specification IS specification (IS 3696-1966) Timber/Bamboo scaffolding shall not be used.

4.4 Working platforms of scaffolds shall have to boards at least 15cm in height to prevent material from failing down.

4.5 A sketch of the scaffolding proposed to be used shall be prepared and approval of the Engineer-in-charge before use.

4.6 Working platform, gangways and stairways shall be so constructed that they shall not sag unduly or unequally and if the height of the platform or gangway or stairway is more than 3.5m babove ground level or floor level, they shall be closely boarded, shall have adequate width for easy move.

4.7 The planks used for working platform shall not project beyond the end supports to a distance exceeding four times the thickness of the planks used. The planks shall be rigidly tied at both ends to prevent sliding and slippage. The thickness of the planks shall be adequate to take load of men and materials and shall not collapse.

4.8 Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent fall of persons or Material by providing suitable fencing or railing, the minimum height of which shall be 1.0m, along with 15cm high sheet of instruction at floor level along the railing.

4.9 Safe means of access shall be provided shall be provided to all working platforms and other elevated working places. Every ladder shall be securely fixed. No single portable ladder shall be over 9m in length. For ladder up to 3m in length the width between side rails in the ladder shall in no case be less than 300 mm For longer ladders this width shall be increased by at least 20 mm for each additional meter of length. Step spacing shall be uniform and shall not exceed 300 mm.

4.10 Adequate precautions shall be taken to prevent danger from electrical lines and equipment. No scaffolding, ladder, working platform runs, etc. shall exist within 3 meters of any uninstalled electric wire. Whenever electric power-and lighting cables are required to run through (Pass No) the scaffolding or electrical equipment are used, such scaffolding structures shall have minimum two earth connections with earth continuity conforming to is code of practice.

5. **EXCAVATION, TRENCHING AND EARTH REMOVAL**

5.1 All trenches 1.2m or more in depth shall at all times be supplied with at least one ladder for each spacing of 30m in length or fraction thereof. Ladder shall be extended from bottom of the trench to at least 1m above the surface of ground.

5.2 The sides of the trench, which are 1.2m or more in depth, shall be stepped back to give suitable slope (angle of response) or securely held by timber bracing, so as to avoid the danger of sides from collapsing. The excavated material shall not be place within 1.5m of the edges of the trench or half of the depth of the depth of the trench whichever is more. Cutting shall be done from top to bottom. Under no circumstances mining or under-cutting shall be done.

5.3 The contractor shall ensure the stability and safety of the excavation, adjacent structures, services and the works.

5.4 Open excavation shall be fenced off by suitable railing and warning signals installed at right at well-lit places so as to prevent persons slipping or falling into the excavation.

5.5 All blasting operations shall be carried out on the basis of procedures approved by Inspector of Explosive. All works in this connection shall be carried out as per IS code of Practice. Barricades warning etc. shall be placed on the roads/open area. Prior approval of such operation shall be obtained from safety Engineer/Engineer-In-charge of works.

a) For removal of the earth from an earth mound a written permission shall be obtained from the Engineer-In-Charge of earth mound.

b) As far as partial earth shall be removed mechanically.

c) Wherever manual removal of earth is involved, earth shall be removed from the top by maintaining the proper slope equal to the angle of response of the earth.

d) Such work shall be contractor's responsible person and frequently inspected by the departmental representative to ensure that no under-cutting is done.

6. **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. This shall be ensured before concrete is poured. The procedure approved by Engineer-In-Charge shall be followed for missing, transporting and pouring of concrete.

7. DEMOLATION

Before any demolition work is commenced and also during the progress of the work:

(a) All roads and open area adjacent to the work site shall either be closed or suitably protected. Appropriate warning signs shall be displayed for cautioning approaching persons.

(b) Before demolition operation being, the contractor shall ensure that the power on all electric service lines is shut off and lines cut or disconnected at or outside the demolition site. If it is necessary to maintain electric power during demolition operation, the required services lines shall be adequately protected against damage. Person handling heavy materials/equipment shall wear safety shoes.

(a) No floor, roof or other part of the building shall be overload with debris or material as to render it unsafe.

(b) Entries to the demolition area shall be restricted to authorized persons only.

8. PERSONAL PROTECTIVE EQUIPMENT

All necessary personal protective equipment as considered necessary by the Engineer-in-Charge shall be kept available by contractor for the use of the persons employed on the site and maintained in a condition suitable for immediate use. Also the contractor shall take adequate steps to ensure proper use of equipment by those concerned. The personal protective equipment is to ensure proper use of equipment is to ensure proper use of equipment by those concerned. The personal protective equipment is to be provided by the contractor.

(a) All persons employed at the construction site shall use safety helmets, if advised by Safety Engineer/Engineer-in-charge.
(b) Workers employed on mixing asphalt materials, cement and lime mortar shall use protective goggles protective footwear and hand gloves. Use of proper respiration shall be an advantage.

(c) Persons engaged in welding and gas-cutting works shall use suitable welding face shields. The persons will assists the welders shall use suitable goggles protective goggles shall be wrong while chipping are grinding.

(d) Stone breakers shall use protective goggles. This shall be seated at sufficient safe interval distance.

(e) Persons engaged in or assisting in short ballistic operations and cleaning the blasting chamber shall use suitable gauntlets, overalls, dust-proof goggles, boot and protective hood supplied with fresh air at the minimum rate of 9m/hr.

(f) All persons working at heights more than 4.5m above ground or floor and exposed to risk of failing down shall use safety belts, unless otherwise protected by changes guard railing, etc. In place where the use of safety belts is impractical, suitable net of adequate strength fastened to substantial support shall be employed.

(g) All powered two-wheeler motor-cycle and inside manholes, which are in use, the contractors shall ensure that the manholes are opened and are equality ventilated at least for an hour. After it has been well ventilated the atmosphere inside the space shall be checked for the presence of any toxic gas or oxygen deficiency and recorded in the register before the workers are allowed to get into the manholes. The manholes opened shall be cordoned off with suitable railing and provided with warning signals or caution boards to prevent accidents. There shall be proper illumination in the right.

9. PAINTING

9.1 The contractor shall not employ women on the work of painting with products con training lead in any form. Only men above the age of 18 years shall be employed on the work with lead paint. The following precautions shall be taken during the work.
Supplied air respirations shall be provided for use by the workers when paint is applied in the form of spray, or surface having leaded paint is dry rubbed or scraped. Overalls shall be supplied by the contractors to the workmen and adequate facilities shall be provided to enable the painters to wash at the cessation of work. All painting jobs, especially those in which leads paints are used shall be kept under Industrial hygiene surveillance.

9.2 Smoking, open flames or sources of ignition shall not be allowed in places where paints and other flammable substances are stored, mixed or used. A caution board with the instructions written in national/regional/regional language, “SMOKING-STRICTLY PROHIBITED” shall be displayed in the vicinity where painting is in progress or where paints are stored symbol shall also be used for caution boards.

Suitable fire extinguishers/stand buckets shall be kept available at places where flammable paints are stored handheld used.

When painting work is done in closed room or in as confined space adequate ventilation shall be provided. If adequate ventilation shall be provided workers shall wear suitable respirations.

9.3 Epoxy resins and their formulations used for painting shall not be allowed to come in contract with the skin. The workers shall use plastic gloves and/or suitable barrier creams.

Adequate ventilation shall be provided especially when working with not resin mixes. Increased personal hygiene shall be practiced to control inadvertent contract with the resin and eliminate its effects.

Workers shall thoroughly wash hands and feel before leaving the work. Work cloths shall be changed and laundered frequently.

10. LIFTING MACHINES AND TACKLES

10.1 Use of lifting machines and tackles including their attachment anchorage and supports shall conform to the following standards or conditions.

a) Lifting machines and tackles shall be of good mechanical construction should material and adequate strength and free from any defects and shall be kept in good repair and in good working order. Every rope used in hosting or lowering material or as a means of suspension shall be of good quality and adequate strength and free from any defect.

b) Every crane operation or lifting appliance operator shall be properly qualified. No person under the age of 21 years shall be in charge of any hosting machine or give signals to operator of such machine.

c) In case of every lifting machine (and of every chain, ring, hook, shackles, swivel and pulley blocked used in hoisting or as means of suspension the safe working load shall be working load shall be working load shall be

ascertained and clearly marked. In case of a lifting machine having variable safe working load, each safe working load and the conditions under which it is applicable shall be clearly indicated. No part of any machinery any gear referred to above in load except for the purpose of testing this shall be approved by the Safety Engineer.

d) In case of departmental machines, the safe working load shall be notified by the Engineer-in-Charge. As regard contractor's machines the contractor shall notify the safe working load of the machine to the Engineer-in-Charge whenever he brings any machinery to site work and get it verified by Engineer-in-Charge, support by as valid test certificate by the competent person.

e) Thorough inspection and load testing of lifting machines and tackles shall be done by a component person at least once every 12 month and records of such inspection and testing shall be maintained.

10.2 Motors, gearing transmission, coupling, belts, chain drives and other moving parts of hosting appliances shall be provided with adequate safeguards, hosting appliances shall be provided with such means as will reduce to minimum the risk of any part of a suspended load becoming accidently displaced or lowered.

11. WELDING AND GAS CUTTING

11.1 Welding and gas cutting operations shall be done by qualified and authorized persons and as per IS specification and code of practice.
11.2 Welding and gas cutting not be carried out in places where flammable or combustible materials are kept and where is danger of explosion due to presence of gaseous mixtures.
11.3 Welding and gas cutting equipment including hoses and cables shall be maintained in good condition

11.4 Barriers shall be erected to protect other persons from harmful rays from the work. When welding or gas cutting is done in elevated positions precautions shall be taken to prevent sparks or hot metal failing on persons or flammable material.

11.5 Suitable type of protective clothing consisting of fire resistant gauntel gloves lieggings boots and aprons shall be provided to workers as protection from heat and hot metal splashes Welding shields with fiter glasses of appropriate shade shall be worn as face protection.

11.6 Adequate ventilation shall be provided while welding in confined space of while brazing cutting or welding zinc, brass bronze, galvanized or fead coated material.

11.7 Welding and gas cutting shall not be done on drums, barrel, tanks or other containers unless they have been empted, cleaned thoroughly and it is made certain that no flammable materials is present.

11.8 Fire extinguisher shall be available near the location of welding operation. Fire safety permit shall be obtained for working at vulnerable area and operating areas before flame cutting/welding is taken up.

11.9 For electric (Arc) welding the following additional safety precaution shall be taken

i) When electrical welding is undertaken near pipelines shall not be used as part of earth conductor but separate shall be connected to the machine directly from job.

ii) Personal contact with electrode or other live parts of electric welding equipment shall be avoided.

iii) Extreme caution shall be exercised to prevent accidental contact of electrodes with ground.

iv) The welding cable shall not be allowed to get entangled with power cables. Is shall be ensured that the cables are not damaged by movement of material.

12. GRINDING:

12.1 All portable grinders shall be used only with their wheel guard in position to reduce the danger from flying fragment should the wheel break during the use.
12.1 Grinding wheel of specified diameter only shall be used on a grinder-portable or
12.2 pedestal in order not to exceed the prescribed peripheral speed.
12.3 Goggles shall be used during operation.

13. ELECTRICITY:

Guidelines for providing temporary power supply at the site and general safety procedures for using electricity are given in the enclosed annexure.

14. HOUSE KEEPING:

14.1 The contractor shall at all times keep his work spot, site office and surrounding clean and tidy from rubbish, scrap, surplus material and unwanted tools and equipments.

14.2 Welding and other electrical cables shall be so routed as to allow safe traffic by all concerned.

14.3 No material on any sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The Engineer-In-Charge may require the contractor to remove any material, which is considered to be of danger or cause inconvenience to the public. If necessary, the Engineer-In-charge may cause them to be removed at the contractor's cost.

14.4 At the completion of the work, the contractor shall have removed from the work premises all scaffolding, surplus material, rubbish and all huts sanitary arrangements used/ installed for his workmen on the site.

14.5 The Engineer-In-Charge has the right to stop work if the contractor fails to improve upon the housekeeping after having been notified.

15. FIRE SAFETY:

All necessary precautions shall be taken on prevent outbreaks of fires at the construction site. Adequate provisions shall be made to extinguish fires should they still break out.

a) Quantities of combustible material like timber, bamboos, coal, paints etc. shall be the minimum required in order to avoid unnecessary accumulation of combustibles at site.

b) Containers of plant, thinners and allied material shall stored in a separate room which shall be well ventilated and free excessive heat, sparks, flame or direct rays of the sun. The containers of paint shall be kept covered pr properly fitted with lid and shall not be kept open except while using.

c) Fire extinguishers as approved by the Engineer-In-Charge shall be located at the construction site at appropriate places.

d) Adequate number of contract workmen shall be given education and training in fire extinguishing methods.

16. SAFETY WORK PERMIT:

16.1 In order to ensure of work for hazardous operation (such as entry into confined space, welding/cutting on equipment/pipes where explosion hazard is present works on high voltage and main medium voltage lines, blasting, etc.) special safety work permits (SWP) shall be raised. The SWP's shall be also to be obtained for any work as recommended by Safety Engineer.

16.2 The contractor shall strictly ensure all the safety conditions and requirements stipulated in the safety work permit. The work permit. The decision of the Safety Engineer shall be final in this regard.

17. WORK IN RADIATION AREA:

The contractor shall follow the stipulated procedure regarding work in the radiation area and other works related with radiography.

18. WORK IN AND AROUND WATER BODIES:

When the work is done near any place where there is risk of drawing, all necessary rescue equipment such as life buoys and life jackets shall provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision shall be made for prompt first-aid treatment of all injuries likely to be sustained during the course of the work. Persons who do not know swimming shall not be engaged along for any work where risk of drawing exists. Sufficient number of life buoys of life jackets shall be provided.

19. MEDICAL FACILITIES:

19.1 The contractor shall arrange adequate facilities for medical aid and treatment for his staff and workers engaged on the work site including the first-aid facilities if they are not available at the project.

19.2 First-aid appliances including sterilized dressing, cotton wool and antiseptic cream shall be made available at readily accessible places at every work site. These shall be maintained in good order under the charge of a responsible person.

19.3 As large work place where hospital facilities are not available within easy reach of the work, first-aid posts shall be established and be manned by a trained compo under. An ambulance shall be available during the entire period of work attending to injury cases.

20. SAFETY OFFICERS/SAFETY COORDINATOR:

The contractor shall have a Safety Officer or a supervisor to be designated as a safety coordinator in order to specifically look into the implemented of different safety requirement of the contractor work. The person thus designated will in general co-ordination with Engineer-In-Charge on matter of safety and in particular ensure that the Safety Guide is complied with fully. His name shall be displayed on the Notice Board at prominent place at the work site.

21. REPORTING OF ACCIDENT:

21.1 All accidents leading to property damage and/or personnel injuries shall be reported to the Engineer-in-charge immediately who shall inform SAROOP to be followed up with detailed accident reports in prescribed from.

21.2 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 properly damage.

22. PUBLIC PROTECTION:

The contractor shall make all necessary provision to project the public. He shall be bound to bear the expenses for defence of every action or other processing at law that may be brought by any person for injury.

GUIDELINES AND GENERAL PROCEDURE FOR SUPPLY AND USE OF ELECTRICITY AT SITE

(A) **GENERAL**

1.1 Following safety requirements shall be complied with before the contractor uses the power supply.

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 safety requirements at site. All cabling and installation comply with the appropriate statutory requirements given below and shall be subject to approval of the Departmental Engineer-in-charge/ Electrical Engineer.

Indian Electricity Act, 1910

Electricity (Supply) Act, 1948

Indian Electricity Rules, 1956

National Electric Code, 1985

Other relevant rules of Local Bodies and Electricity Boards.

After installation of the electrical power wiring works by the contractor form of completion certificate as per IS 732 (form SGCW-1) shall be submitted by the contractor duly signed by the authorized valid license and/or supervisor along with one copy of the contractor's License and/or competency certificate of supervisor issued by the Electricity Board/Government Electricity Organization as per the enclosure.

The Power supply shall be regulated as per the terms and conditions of the supply of the respective electricity boards.

1.3 Tor purpose of electrical load and power planning by the electrical section, the contractor shall furnish along with the tender the estimated load requirement of electric power for the execution of the contract works in terms of maximum kilo watt or KVA demand during various periods/months of the contract period along with the details of the construction electrical equipment/machinery with their individual load details and location/locations of power supply required for availing temporary electric power supply in the standard Proforma enclosed (Form SGCW-2).

1.4 The electric power supply will be generally made available at one point in the works site of the contractor by the department.

1.5 Where distribution boards are located at different places the contractor shall submit schematic drawing indicating all details like size of wires, overhead or cable feeder, earthing, etc. The position and location of all equipments and switches shall be given.

1.6 The contractor shall make his own arrangements for main earth electrodes and tappings 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. specification (IS-3043).

1.7 All there phase equipment shall be provided with double earthing. All light fixtures and portable equipment shall be effectively earthed to main earthing.

All earth terminals shall be visible. No gas popes and water pipes shall be used for earth connection. Neutral conductor shall not be treated as earth wire. The contractor shall not connect any additional power required, test reports of the tests mentioned in (d) of form SGCW-1 shall be submitted.

1.8 Joints in rating conductors shall be avoided loop earthing of equipments shall not be allowed. However trapping form an earth bus may be done.

The test procedure and their results shall conform to relevant IS specification. The contractor shall submit a test report for his complete installation every 2 months or after rectifying any faculty section in the specimen test report. One such test report for the complete installation shall be submitted before onset of monsoon.

1.9 Electrical power supply at Medium voltage (415 volt, 3 phases, and 4 wires) for constructional purpose and general lighting will be made available at site or near site of work at the discretion of Engineer-in-charge at one point. The distance will not however, exceed 50 meters from the building site. The contractor has to lay the power lines from this point at his own cost in an approved manner as indicated in subsequent clauses. The power supply will be made available subject to following:

1.10 The contractor should submit a list of equipments he proposed to connect for constructional and general lighting purposes indicating his power requirements in appropriate form enclosed (Annexure-I) for approval of Engineer-in-charge. A list of licensed electrical staff he will be posting at site.

1.11 The contractor should pay the minimum charges based on his power demands at Current tariff rates prevailing at site as charged by supply authorities and as shown in schedule 'A' (Schedule of Materials to be supplied).

1.12 Suitably rated KWH meter will be supplied and installed by contractor and test certificates as per ISS from authorised test lab or manufacturer is submitted.

1.13 All extension from this point shall be executed in an approved manner with prior permission of Electrical Engineer. The installation shall conform to Indian Electricity Rules, Indian Electricity Act 1910 & IRE Regulations as per the latest Revisions and got executed by Licensed Electrical Contractors only.

1.14 The entire installation shall be subject to the following tests before energisation of installation including portable equipments.

a) Insulation resistance test
b) Polarity test of switches
c) Earth continuity test
d) Earth electrode resistance

The testing procedure and results shall conform to ISS & Code of practice. The contractor shall provide the necessary skilled and unskilled labour and also instruments for conducting the test. The tests shall be carried out in the presence of Electrical Engineer and submitted in proforma enclosed (Annexure-II).

1.15 Double grounding will be provided for all equipments. Power supply will be affected after completion of above.

(B) AFTER ENERGISING THE INSTALLATION CONTINUITY OF POWER SUPPLY WILL BE SUBJECT TO THE FOLLOWING:

i) The contractor shall submit a test report as per Clause (A) (vii) a, b, c, d for his complete installation every 2 months or after rectifying any faulty section in the specimen test report enclosed (Annexure II). One such test report for the complete installation shall be submitted before onset of monsoon.

ii) The contractor should not connect any additional load without prior permission of Electrical Engineer. For obtaining additional power required, test reports should be submitted.

iii) Where distribution boards are located at different places, the contractor shall submit schematic drawing indicating all details like size of wires, OH or cable feeders, earthings etc.

iv) The supply will be switched off by the Elec. Engineer by prior arrangement with Dept. for normal and preventive maintenance etc., of Departmental equipments once in a month. The duration and time will be intimated to contractor. The availability of power supply will be further subject to shut down due to any emergency break downs or switch off by supply authorities for their maintenance works. Contractor is not eligible for any compensation due to above. Government will not be liable for any loss or damage to the contractor's equipment as a result of variations in voltage or frequency of interruptions in power supply. In the event of any failure / interruptions /stoppage of power supply for a continuous period not exceeding 24 hours the contractor shall have no claim whatsoever against 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 for any compensation in this account. Government will not be liable for any loss to the contractor arising from failure or interruption or stoppage of works any attendant delays consequent upon such failure, interruption or stoppage of power supply or variations in voltage or frequency.

(C) THE FOLLOWING ARE PROVIDED FOR GENERAL GUIDANCE OF THE CONTRACTOR AND SHOULD BE READ AS SPECIFIC REQUIREMENTS, IN ADDITION TO COMPLYING WITH INDIAN ELECTRICITY ACT, INDIAN ELECTRICITY RULES, I.S. REGULATIONS.

i) The minimum clearance to be maintained for all overhead line shall be 4 meters along roads and 6.1 meters across roads.

ii) Wherever cables or wires are laid on poles a guard wire of adequate size shall be run along the cables/wires and earthed effectively.

iii) Metallic poles as general rule should be avoided and if used should be earthed individually.

iv) All loose hanging of wire and cables should be avoided and should be properly supported and an approved method of fixing shall be adopted.

v) Installation shall not cause any hindrances to movement of men and materials.

vi) Reinforcement rods or any metallic part of structures should not be used for supporting wires and cables fixtures, equipments etc.

vii) All cables and wires should be adequately protected mechanically against damages.

viii) In case the cable is required to be laid in ground, it should be adequately protected by covering the same with bricks, PCC title or any other approved means.

ix) Laying of cables and wires direct on floor shall be avoided but if, required the same shall be taken through G.I. / M.S. pipes etc.

(D) i) All the switch boards, equipments etc. should be protected from rain and should not be exposed to weather. The contractor should provide proper enclosure of approved size and shape for protection against rain.

ii) As far as possible, switch fuse units and Distribution Boxes etc. with HRC fuses should be used.

iii) The switch fuse units should be checked for their proper function. As far as possible new equipments should be used. However, the same shall be in a very good condition. ISI marked equipments from reputed manufacturers will be preferred. Switch fuse units of appropriate ratings of fuse be utilised for the required power supply and all terminals in the external supply should, as far as possible, be taken from the bottom of the switch such that rain water or its spray will not enter the switch boards from the top. All switches of the switch boards should have proper gaskets so that no water will enter even if rain water or its spray falls on the switches.

iv) All the Distribution Boards, Switch fuse units, Bus bar chambers etc. shall be dust and vermin proof. The distribution boards, switches etc. shall be so fixed that they should be easily accessible. The position and location of all equipments, switches etc. shall be informed to the Electrical Engineer at the time of energisation. Also, the same should be informed as soon as any change is done.

(E) i) Only PVC insulated & PVC sheeted wires or armoured PVC insulated and sheeted cables should be used for external power supply connections of temporary nature. Weather proof rubber wire should not be used for any temporary power supply connections. Taped joints in the wires shall be avoided as far as possible and the connections shall be made in looping system. At the terminal points of the switch boards,
an effective PVC Box or alternatively M.S. Box, with proper glands and sealing arrangements, should be provided to ensure that no moisture leaks at the terms of the switches.

ii) All armoured cables shall be properly terminated by using suitable cable glands, standard conductor cables shall be connected by using cable lugs / sockets, Cable lugs should preferably be crimped, cable lugs should be proper size and should correspond to the current rating and size of the cables. Twisted connections will not be allowed.
iii) All the cables glands shall be properly earthed.

iv) All connections to lighting fixtures, starters or other power supply should be provided with PVC insulated, PVC sheeted twin core wires to have better mechanical protection for preventing possible damage to equipment or injury to personnel. No taped joints will be allowed and the connections may be looping system.

v} All the lighting fixtures and lamp holders shall be of good quality and in good condition. Badly repaired or broken holders etc. will not be allowed for use.

vi} The working areas shall be adequately lighted. The lighting fixtures shall be fixed in such a manner such that sufficient head clearance is provided for general working.

vii} For day to day lighting requirements it is preferred that an extension board is used for three pin plugs should be used for tapping. By using the extension boards any number of light points can be tapped as and when required, without having any joints in wires.

viii) The connection for portable machines shall be taken through 3 pin plugs points, Iron clad industrial type plug outlets are preferred. While taking supply through plug outlet a plug top must be used. The third pin of the plug shall invariably be earthed and 3 core wires shall be used.

ix} Wire guards shall be provided on bulbs as far as possible.

(F) (i) Method of earthing, installation and size of earth electrodes and earthing conductors and earth testing results shall conform to relevant I.S. etc.

ii) Generally the contractor shall make his own arrangements for main electrode and taping thereof. The existing earth points available at site can be used at the discretion of the Electrical Engineer with prior permission.

iii} Joints in earthing conductor shall be avoided as far as possible. However in case of a joint it should be properly soldered or jointed in an approved manner. Twisting of wires will not be allowed. Loop earthing of equipment shall not be allowed. However, tappings from on earth bus may be done. Every equipment should be provided with two independent earth connections except for portable equipments.

iv) All three phase equipments shall be provided with duplicate earthing./ All light fixtures and portable equipments should be effectively earthed to main earthing.

(G) POWER SUPPLY TO ALL THE MACHINES AND LIGHTING FIXTURES ETC. SHALL BE SWITCHED OFF WHEN NOT IN USE.

i) Persons having valid wireman's license / competency certificate must be employed for carrying out electrical work and repair of equipments, installation and maintenance at site. A qualified /licensed supervisor may also be employed for supervision.

ii) An electric power failure and/or accident caused due to noncompliance of above mentioned instructions will entirely be the responsibility of the contractor.

iii) On recommendations by the Electrical Engineer the Engineer-in-charge reserves the right to disconnect the power supply to the contractor without prior intimation. If the above mentioned instructions are not Followed contractor will not be eligible for any compensation due to such disconnections.

SAFETY INSTRUCTIONS: ELECTRICAL OPERATIONS

I. INSTALLATION

1. Only Persons having valid wireman‘s licence /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.

2. Electrical equipment and installation shall be installed and maintained as to prevent danger from contract with live conductors and to prevent fires originating from electrical causes like short circuit, overheating, etc. Installation shall not cause any hindrance to movement of men material.

3. Material for all electrical equipment shall be selected with regard to working voltage, load and working environment. Such equipment shall conform to the relevant standards.

4. The minimum clearance to be maintained for all overheads lines alone and across roads shall be as per the statutory requirements as listed in clause 1.2 Annexure.

5. Grounding conductor of wiring system shall be copper or other corrosion-resistant material. An extra grounding connection shall be made in appliances/equipment where chances of electric shock are high.

6. 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 5KW or more earth leakage circuit breaker shall be provided in the circuits.

7. Wherever cables or wire 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. Ant climbing guard's notices shall be provided on poles. Each equipment shall have individual isolating swathes.

8. Wire and cables shall be properly of fixing shall be adopted. Loose hanging of wires and cables shall be avoided. Lighting and circuits shall be kept distinct and separate.

9. Reinforcement roads or any metallic part of structure shall not be used for supporting wires and cables, fixtures, equipment, earthing, etc.

10. 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.

11. All armcured cables shall be properly terminated by using suitable cable gland Multithreaded conductor cables shall be connected by using cables lugs/socket cables lugs shall preferably be crimped. They shall be of proper size and shall and shall correspond to the current rating and size of cable. Twisted connection will not be allowed.

12. All cables gland, armouring and sheathing of electric cables, metal circuits and their fitting, metallic fitting and other non-current carrying parts of electrical equipment and apparatus shall be effectively grounded.

13. All the Distribution Boards, switch use units, Bus bar chambers, etc. shall have MS enclosures and shall be free from dust, vermin and water. 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.

14. The Contractor shall Provided proper enclosures/ cover of approved size and shape for Protection of all the switchboard, equipment etc. against rain. Exposed live part of all electrical circuits and 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 normally working conditions insulated shall be placed such that they are inaccessible under normal working conditions.

15. Ironclad industrial type plug outlets are preferred for additional safety.

16. 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.
17. Isolating switches shall be provided close to equipment for easy disconnection or electrical equipment or conductors from the source of supply when repair or maintenance work has to be done on them.

18. In front of distribution boards a clear apace of 90 cm shall be maintained in order to have easy access during an emergency.

19. Adequate working spaces shall be provided around electrical equipment which required adjustment or examination during operation.

20. As far as possible 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 workroom where there is possibility of explosion hazards shall be explosion proof.

21. All connection to lighting fixtures, started or other power supplies shall be provided with PVC insulated 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 or motors, switches shall not be mounted on wooden boards. Only sheet steel mounting or iron frame work shall be used.

22. All the lighting fixtures and lamp holders shall be of good quality and in good condition. Badly repaired or broken holder, etc, shall not be used.

23. Only PVC insulated and PVC sheathed wires or armoured PVC insulated and sheathed cables shall be used for external power supply connection of temporary nature. Weather proof tuber wires shall not be used for any temporary power supply connections. Taped joints in the wires shall not be used.

24. 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.

25. After installation of new electrical system and or other extensive alterations to existing installation, through inspection shall be made by Departmental Electrical Engineer before the system or new extension is put in use.

26. Contractor shall ensure that power factor for their loads shall be main trained at 0.85. in case the power factor falls below 0.85, necessary capacitor units shall be provided by the contractor. Electrical equipment and installations should be so designed, installed and maintained at to prevent danger from contact with live conductors and / or from electrically originated fire. Only qualified/licensed persons should be permitted to install, adjust, examine on repair electric equipment/circuits.

27. Materials for all electrical equipment should sealed with regard to working voltage, load and working environment, such equipment should conform to the relevant standards. Exposed live parts at electrical circuits and equipment operating with alternating current (AC) at 50 volts or more should be generally provided with permanent enclosures / cover. Crane trolley wires and other conductors, which cannot be completely insulated, should be placed such that they are inaccessible under normal working conditions.

28. Armouring and sheathing of electric cables, metal circuits and their fittings, metallic fittings and other non-current carrying parts of electrical equipment and apparatus should be effectively grounded. Grounding conductor of wiring system should be copper or other corrosion resistant material. An extra grounding connection should be made in appliances / equipments where chances of electric shock are high.

29. Electric fuses and / or circuit breakers installed in equipment circuits for short circuit protection should be of proper rating. It is also recommended that high rapture capacity (HRC) fuses should be used wherever possible in circuits carrying currents more than 15 amps. Open type distribution boards should be placed only in dry and ventilated rooms, they should not be placed in the vicinity of storage batteries in otherwise exposed to chemicals fumes.

30. Isolating switches should be provided for disconnecting electrical equipment or conductors from the source of supply when repair or maintenance work has to be done on them. As far as possible electrical switches should be excluded from a place where there is danger of explosion. All electrical equipments such as motors, switches and lighting installed in work room where there is possibility of explosion hazard should be explosion proof type approved by CMRS, Dhanbad.

II) OPERATION & MAINTENANCE:

i) A person who works with electrical installation / equipment should be aware of the electrical hazards, use of protective devices and safe operational procedures. They should be given training in fire fighting, first aid and artificial resuscitation techniques.

ii) The supervisor should instruct in the proper procedure, specify and enforce the use of necessary protective equipment such as adequately insulated pliers, screw drivers, fuse pullers and similar hand tools. Only wooden ladders should be used to reach the heights in electrical work. No material or earth work shall be allowed to be dumped or in the vicinity of the bare overhead lines conductors.

iii) Before any maintenance work is commenced on electrical installation / equipment the circuits should be de-energised and ascertained to be dead by positive test with an approved voltage testing device. Switches should be tagged or the fuse holders withdrawn before starting the work.

iv) Adequate precautions should be taken in two important aspects

a) That there shall be no danger from any adjacent live part and

b) That there shall be no chances of re-energisation of the equipment on which the persons are working.

v) While working or near a circuit, whenever possible the use of only one hand should be practised even though the circuit is supposed to be dead. The other hand may preferably be kept in pocket.

vi) When it is necessary to touch electrical equipment (for example when checking for overload or motors) back of the hand may be used. Thus, if accidental shock were to cause muscular contractions, one should not 'freeze' to the conductor.

vii) Operation of electrical equipment should be avoided when standing on wet floor or when hands are wet.

viii) Before blown fuses are replaced, the circuit, should be locked out and investigations should be made for the cause of the short-circuit or overload.

ix) Pliers, screw drivers, testing lights and other tools for the work should be adequately insulated for voltage involved.

x) When two persons are working within reach of each other, they should never work on different phases of the supply.

xi) When structural repairs, modification or painting works are undertaken, appropriate measures should be taken for the protection of persons where work may bring them into the proximity of live equipment I circuit.

xii) Temporary electrical connections should be removed as soon as the stipulated work is over.

xiii) An insulation resistance test should be carried out every time equipment is connected back after alterations or repair. Also, insulation resistance tests (meggar tests) should be made periodically and significantly low readings or sudden changes should be carefully investigated. Outside installations which are exposed to weather should be tested more frequently.

xiv) It should be ensured that no extension boards are over loaded while tapping. Only standard three pin plugs should be used for tapping electricity. Broken sockets I plugs should be replaced immediately with good ones. Joint free cables only should be used for connecting equipment I apparatus.

xv) Floors should be kept free from tailing electrical cables to avoid tripping hazard.

III) PORTABLE ELECTRICAL EQUIPMENT

i) Portable electrical equipment should be regularly examined, tested and maintained to ensure that the equipment and its loads are in good order.

ii) All portable appliances should be provided with a three pin plugs. It should be ensured that the metal part of the equipment should be effectively earthed.

iii) BARE WIRE SHOULD NOT BE USED FOR TAPPING ELECTRICITY

a) It should be ensured that the insulation and wire size of extension cords are adequate for the voltage and current to be carried.

b) All loose wiring such as trailing and flexible cables for portable lamps, tools and apparatus should be regularly examined.

IV. GENERAL SAFETY PROCEDURE

1. It should be ensured that power supply to equipment is disconnected before any repair work is undertaken. Insulated tools shall be used for working on electrical equipment's. At building constructional sites, helmets and safety shoes shall be used.

2. In case of an accident the security staff on duty shall be informed immediately. Also the Engineer-in-charge, Electrical Engineer, Safety Co-ordinator of the Project. Administrative Officer of the Project and Tarapur / Tarapur dispensary shall be informed.

3. In case of an electrical accident a report should also' be sent to the Electrical Inspector, on prescribed proforma, under intimation to the Electrical Engineer and the Engineer-in-charge. Also, resuscitator may be used.

4. In case of fire hazard, BARC **Fire Brigade (Phone No. 63101/65101/66101)** shall also be informed immediately. For Tarapur works the Security Officer, Tarapur shall be contacted through Assistant Security Officer, PREFRE.

5. The contractor shall keep a first aid kit at site. However, in case of accident major/Serious) the victim shall be taken to BARC, Tarapur Dispensary before removing from the premises, **(Dispensary Phone No. 63199/65199).** For Tarapur works the victim shall be taken to TAPS Hospital at Tarapur.

6. In case of working at a high elevation either safety belts shall be used or railing / enclosure shall be provided around the working platform / Cage / ladder etc.

7. Ropes, shackles, chains, slings etc. to be used (especially for use of tying the scaffolding etc.) shall be periodically checked for integrity and mechanical soundness and corrected by replacement. All safety procedures and practices as informed by Department should be followed.

Annexure – I

(Claim A (ii))

(Under Clause 15)

FORM OF REQUISITION FOR SUPPLY OF ENERGY

To

_____,_____.

Sir,

I/We, require power supply at 415V, 3 Phase 4 wire for our installation at the following

Location for a period of _____ year/months.

Location of the Project: _____

The installation shall be executed by the following Electricity Contractor:

Name of the Contractor: _____

License No. & Grade "_____

The detail of the proposed layout is as follows:

Description H.P./KW Type of Starting Single Phase or 3 Phase Meters

(i)

(ii)

(iii)

Other Plants.

Lighting Layouts

Lights at office, stores etc.

Ceiling fans.

Heaters :

Socket 54 x 5 ph.,154 x 5 p.h.

Outdoor Lights :

Number and Wattage.

3. We propose to install overhead lines with bare conductors/double P.V.C. insulated wires/underground cables. Brief details to be given (wires type of pole Brief details to be given (wires type of pole to be used etc. in case of underground cables – Tupe & Number of joints.

We shall be providing the earthing layout as follows :

(a) Type of each electrode : Plate/pipe coiled earth

(b) Materials : Copper/G.I.

(c) No. of electrodes & Location :

(d) Min. size of earth conductor on OH layout & bearer wires :

(e) Any other relevant details :

4. Total maximum demand for our layout will not exceed _____KW/KVA.

5. We shall be providing our own KWH meter and test certificate for the KWH meter will be submitted before effecting power supply.

6. We agree to pay towards electricity bill during the calendar months for consumption of energy on unit basis at rates indicated or minimum charges on the connected load whichever is higher.

7. The installation shall be executed conforming to I.S. Code of practice and Indian Electricity Rules with their latest revision.

8. We shall be submitting required test reports in proforma enclosed every month and before on set of monsoon.

9. We shall maintain our installation in good repair and conform to all statutory regulations of Central/State Government and also as pet safety regulations that will be intimated by the Department from time to time at our own cost and risk. We have also read the guide lines to temporary supply of Department and agree to abide by them.

Signature of the Contractor

Annexure – II

(Claim A (vii) & B (I))
Under Clause 15.
TEMPORARY POWER SUPPLY
DETAILS AND TEST REPORTS
Ref No. : _____ Date: _____
Name of the contractor: _____
Address: _____
_____
Name of the Licensed
Electrical Contractor/: _____
Supervisor:_____
_____
I/We hereby certify that the installation detailed below has been installed by me/us and tested and that to the best of my/our knowledge and belief, it complied with Indian Electricity Rules, 1956.
Electrical Installation at _____
Voltage and system of supply_____
1. Particulars of works:
(a) Internal Electrical Installations:
No. of Load Type of system of writing
(i) Light point
(ii) Fan Point
(iii) Plug point
a) 3 Pin 5 Amp.
b) 3 Pin 15 Amp.
c) Others.

	Description	HP/KW	Type of Starting	Single Phase/ Three Phase
a) Motors	(i)			
	(ii)			
	(iii)			

b) Other plants.
c) If the work involves installation of overhead line and/or underground cables:
a) i) Type and description of overhead lines.
ii) Total length and No. of Spans.
b) i) Total length of underground cable and its size.
ii) No. joints End joint
Tee joint
St. through joints.
NOTE: All outdoor lines should be of doubly installed lines and wires should conform to IS 3035.
II. Earthing:
i) Description of earthing electrode.
ii) No. of earth electrodes.
iii) State of main earth load.
(ii) Main control switch _____mps _____ Vlts. _____PH_____N
(ii) Energy meter details Sr.No _____make_____
_____ph_____wire
(_____230)
_____250V
_____Rev/kwh
Initial reading on the Meter _____on_____
(iii) Meter test certificate attached: Yes/No.
(iv) Test results.
a) Insulating Resistance
i) Insulation resistance of the whole system of conductors to earth _____megaohms.
ii) Insulation resistance between the phase conductor and neutral.
Between Phase R and neutral _____ megaohms
Between Phase Y and neutral _____ megaphms
Between Phase B and neutral _____ megaohms.
iii) Insulation resistance between the phase conductors in case of polyphase supply.
Between phase R and Phase Y _____ megaphms.
Between phase Y and Phase B _____ megaohms.
Between phase B and Phase A _____megaohms.
iv) Insulation resistance of motor/other plants.

S.No.	Equipment	Capacity	I.A. Test Result

b) Earth continuity test Maximum resistance between any point in the earth continuity conductor including metal conducts and main earthing lead. _____ohms.
c) Earth electrode resistance
Resistance of each earth electrode.
i) _____ohms.
ii) _____ohms
iii) _____ohms
iv) _____ohms
d) Name and signature of License wireman who will operate and maintain Contractor's installations : _____

License No. _____

Signature of Electrical
Supervisor/Contractor
License No. & Class

Signature of the Contractor
Name & Address:

FORM NO. SGCW - 1

FORMAT FOR ELECTRICITY SUPPLY

I/We certify that the installation detailed below has been installed by me/us and tested and that do the best of my /our knowledge and belief, it complies with Indian electricity Rules, 1956 as well as IS: 732-1968 code of practice for Electrical Writing Installation (System Voltage)not exceeding 650 volts (Revised).

Electric installation at.....

Voltage and system of supply.....

A)

Sr. No	Particular of work	Number of load	Total of wiring	Total wiring
1	Lights Points			
2	Fan Points			
3	Plug Points			
4	Motors			

B) If the work involves installation of overhead lines and/or underground cable.....

C) Earthing:
   i) Description of earthing electrode:
   ii) Size of earth wire:
   iii) Number of electrode provide

D) Test results:
   1) Insulation resistance for the whole installation:
      Between conductors
   Between each conductor and earth
   2) Resistance of earthing electrodes or earthing system
   3) Maximum earthing resistance of installation.....

Signature of Supervisor
Name& Address of Supervisor

Signature of Contractor
Name & address of Contractor

FORM NO. SGCW – 1

'A' APPLICATION FORSERVICE CONNECTION BY CONTRACTOR

(To be filled in Triplicate)

1. Name & Address of Contractor:
2. Reference to Tender & Work Order:
3. Completion Period
4. Connection load details
   (Please attach details in a separate sheet)
5. Max. Demand anticipated:
6. Nature of service connection requires:
   (Whether single or three phase)
7. Place where service required:
   a) Works:
   b) Colony:
8. If supply of electricity is free or chargeable:
   (Please: Enclosed extra of conditions from the tender)
9. Details of meter provided:
   a) If meter required from the department:
      Whether SD is paid
   b) Details of SD (Security Deposit)
   c) Whether meter is tested or not:
      if tested, attach the test report, if not, Details of testing fee deposited
10. Name of Supervisor/ Electrical-in-charge of installation and maintenance
11. Electrical license No. of person Mentioned against col. 10
12. Electrical safety appliances available for use
13. First Aid facility box available For use, if any

(Signature of the Contractor)
Name:
Date:

'B' CERTIFICATE BY THE SAFETY ENGINEER

Certified that my/our installation have been carried out in accordance with I.E. Rules and that I/We have employed competent persons to handle the installations

I/We am /are agreeable to the bills, in respect of this service connections beings raised on the basis the connected load furnished above, in case the actual consumption falls below the stipulated by tender conditions

(Signature of the Contractor)
Name:
Date:

'C' CERTIFICATE BY THE CONTROL ENGINEER

Verified the particulars and forwarded to the Engineer-in-charge

(Signature of the Contract Control Engineers)
Name:
Section Civil/Electrical/Mechanical
Date:

'D' CERTIFICATE BY THE ENGINEER-IN-CHARGE

Certified that the particulars furnished by the Contractor are used to the best of my knowledge and belief and that I have satisfied myself as the safe conditions of electrical installations for which the service connection is applied.

Signature:
Name:
Designation with Section:
Date:

'E' CERTIFICETE BY THE SAFETY ENGINEER

Certified that I have inspected the electrical installation referred herein and after satisfying myself about the safe conditions of the installation, I hereby recommend that the service connection be given to the contractor.

(Signature of the Safety Engineer)
Name:
Date:

'F' AUTHORISATION BY THE ELECTRICAL ENGINEER

Service connection may be/may not be given for the reasons notice here under.

(Signature of Electrical Engineer)
Name:
Date:
Designation:

'G'REPORT OF COMPLIANCE

Service connection is given by me on

a) Meter Nos: 1).....
2).....
3).....

a) Initial readings:
1).....
2).....
3).....

c) Location
1).....
2).....
3).....

d) Meter sealing:
1).....
2).....
3).....

Signature of Electrical Engineer
(Metering and Billing)
Name
Date: Designation:

Note:
(G) Filled up by the Electrical Engineer after power supply is given
Copy to contract Control Engineer

After all the formalities are completed and Report of compliance
Copy to Safety Engineer
Copy to Electrical Engineer

III (4) - MODEL RULES

1. **APPLICATION** These rules shall apply to all building and construction works in charge of NRB,BARC,Tarapur, Department of Atomic Energy in which twenty or more workers are ordinarily employed or are proposed to be employed on any day during the period during which the contract work is in progress.

2. **DEFINITION** Work place means a place where twenty or more workers are ordinarily employed or are proposed to be employed in connection with construction work on any day during the period during which the contract work is in progress.

3. **FIRST-AID FACILITIES**

(i) At every work place there shall be provided and maintained, so as to be easily accessible during working hours, first-aid boxes at the rate of not less than one box for 150 contract labour or part thereof ordinarily employed.
(ii) The first-aid box shall be distinctly marked with a red cross on white ground and shall contain the following equipment, namely:—

(a) For work places in which the number of contract labour employed does not exceed 50 each first-aid box shall contain the following equipments:

1. 6 small sterilised dressings.
2. 3 medium size sterilised dressings.
3. 3 large size sterilised dressings.
4. 3 large sterilised burn dressings.
5. 1 (30 ml.) bottle containing a two per cent alcoholic solution of iodine.
6. 1 (30 ml.) bottle containing salvolatile having the dose and mode of administration indicated on the label.
7. 1 snake-bite lancet.
8. 1 (30 gms.) bottles of potassium permanganate crystals.
9. 1 pair scissors.
10. 1 copy of the first-aid leaflet issued by the Director General, Factory Advice Service and Labour Institutes, Government of India.
11. 1 bottle containing 100 tablets (each of 5 gms.) of aspirin.
12. Ointment for burns.
13. A bottle of suitable surgical antiseptic solution.

(b) For work places in which the numbers of contract labour exceeds 50. Each first-aid box shall contain the following equipments:

1. 12 small sterilised dressings.
2. 6 medium size sterilised dressings.
3. 6 large size sterilised dressings.
4. 6 large size sterilised burn dressings.
5. 6 (15 gms.) packets sterilised cotton wool.
6. 1 (60 ml.) bottle containing a two per cent alcoholic solution of iodine.
7. 1 (60 ml.) bottle containing salvolatile having the dose and mode of administration indicated on the label.
8. 1 rolls of adhesive plaster.
9. 1 snake-bite lancet.
10. 1 (30 gms.) bottle of potassium permanganate crystals.
11. 1 pair scissors.
12. 1 copy of the First-Aid leaflet issued by the Director General, Factory Advice Service and Labour institute, Government of India.
13. A bottle containing 100 tablets (each of 5 gms.) of aspirin.
14. Ointment for burns.
15. A bottle of suitable surgical antiseptic solution.

(iii) Adequate arrangements shall be made for immediate recoupment of the equipment when necessary.

(iv) Nothing except the prescribed contents shall be kept in the first aid box.

(v) 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 work place.

(vi) A person in charge of the First-Aid box shall be a person trained in First-Aid treatment, in work places where the number of contract labour employed is 150 or more.

(vii) In work places where the number of contract labour employed is 500 or more and hospital facilities are not available within easy distance of the works, First-Aid posts shall be established and run by a trained compounder. The compounder shall be on duty and shall be available at all hours when the workers are at work.
(viii) Where work places are situated in places which are not towns or cities, a suitable motor transport shall be kept readily available to carry injured person or persons suddenly taken ill to the nearest hospital.

4. DRINKING WATER

(i) 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.
(ii) 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.

(iii) Every water supply of storage shall be at a distance of not less than 50 feet from any latrine, drain or other source of pollution. Where water has to be drawn from an existing well which is within such 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 wells shall be entirely closed in and be provided with a trap-door which shall be dust and water proof.

(iv) 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 FACILITIES

(i) In every work place adequate and suitable facilities for washing shall be provided and maintained for the use of contract labour employed therein.
(ii) Separate and adequate screening facilities shall be provided for the use of male and female workers.

(iii) Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition.

6. LATRINES AND URINALS

(i) Latrines shall be provided in every work place on the following scale, namely:

(a) Where females are employed, there shall be at least one latrine for every 25 females.

(b) Where males are employed, there shall be at least one latrine for every 25 males. Provided that where the number of males or females exceeds 100, it shall be sufficient if there is one latrine for 25 males or females, as the case may be, up to the first 100, and one for every 50 thereafter.

(ii) Every latrine shall be under cover and so partitioned off as to secure privacy and shall have a proper door and fastening.

(iii) **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. Latrines shall not be of a standard lower than bore-hole system.
(iv) (a) Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal, a notice in the language understood by the majority of the workers “For Men only” or “For Women only” as the case may be.

(b) The notice shall also bear the figure of a man or of a woman, as the case may be.

(v) There shall be at least one urinal for male workers up to 50 and one for female workers up to 50 employed at a time. Provided that where the number of male or female workmen, as the case may be, exceeds 500, it shall be sufficient if there is one urinal for every 50 males or females up to the first 500 and one for every 100 or part thereof, thereafter.
(vi) (a) The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times.

(b) Latrines and urinals other than those connected with a flush sewerage system shall comply with the requirements of the Public Health Authorities.

(vii) Water shall be provided by means of a tap or otherwise so as to be conveniently accessible in or near the latrines and urinals.

(viii) Disposal of excreta: Unless otherwise arranged for by the local sanitary authority, arrangements for proper disposal of excreta by incineration at the work place shall be made by means of a suitable incinerator. Alternately excreta may be disposed of by putting a layer of night soil at the bottom of a pucca tank prepared for the purpose and covering it with a 15 cm. layer of waste or refuse and then covering it with a layer of earth for a fortnight (when it will turn into manure).

(ix) The contractor shall, at his own expense, carry out all instructions issued to him by the Engineer-in-Charge to effect proper disposal of soil and other conservancy work in respect of the contractor's workmen or employees on the site. The contractor shall be responsible for payment of any charges which may be levied by Municipal or Cantonment Authority for execution of such work on his behalf.

7. PROVISION OF SHELTER DURING REST

At every place there shall be provided, free of cost, four suitable sheds, two for meal, and the other two for rest separately for the use of men and women labour. The height of each shelter shall not be less than 3 meters from the floor level to the lowest part of the roof. These shall be kept clean and the space provided shall be on the basis of 0.6 Sq.m. per head.

8. CRECHES

(i) At every work place at which 20 or more women workers are ordinarily employed, there shall be provided two rooms of reasonable dimensions for the use of their children under the age of six years. One room shall be used as a play room for the children and the other as their bed-room. The rooms shall be constructed on a standard not lower than the following.
a) Thatched roof.

b) Mud floors and walls.
c) Planks spread over the mud floor and covered with matting.
(ii) The rooms shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the places clean.
(iii) The contractor shall supply adequate number of toys and games in the play rooms and sufficient number of cots and beddings in the bed room.
(iv) The contractor shall provide one Dai to look after the children in the creche when the number of women workers does not exceed 50 and two Dais when the number of women workers exceeds 50.

(v) The use of the rooms earmarked as creches shall be restricted to children, their attendants and mothers of the children.

9. CANTEENS

(i) In every work place where the work regarding the employment of contract labour is likely to continue for six months and wherein contract labour numbering one hundred or more are ordinarily employed, an adequate canteen shall be provided by the contractor for the use of such contract labour.
(ii) The canteen shall be maintained by the contractor in an efficient manner.
(iii) The canteen shall consist of at least a dining hall, kitchen, store room, pantry and washing places separately for workers and utensils.

(iv) The canteen shall be sufficiently lighted at all times when any person has access to it.

(v) The floor shall be made of smooth and impervious material and inside walls shall be lime washed or colour washed at least once in each year: Provided that the inside walls of the kitchen shall be lime washed every four months.
(vi) The premises of the canteen shall be maintained in a clean and sanitary condition.

(vii) Waste water shall be carried away in suitable covered drains and shall not be allowed to accumulate so as to cause a nuisance.

(viii) Suitable arrangement shall be made for the collection and disposal of garbage.
(ix) The dining hall shall accommodate at a time 30 per cent of the contractor labour working at a time.
(x) The floor area of the dining hall, excluding the area occupied by the service counter and any furniture except tables and chairs shall not be less than one square meter per diner to be accommodated as prescribed in sub-rule (ix).
(xi) (a) A portion of the dining hall and service counter shall be partitioned off and reserved for women workers, in proportion to their number.
(b) Washing places for women shall be separate and screened to secure privacy.
(xii) Sufficient tables, stools, chairs or benches shall be available for the number of diners to be accommodated as prescribed in sub-rule (ix).
(xiii)(a) (1) there shall be provided and maintained sufficient utensils, crockery, furniture and any other equipments necessary for the efficient running of the canteen.
(2) The furniture, utensils and other equipments shall be maintained in a clean and hygienic condition.
(b) (1) Suitable clean clothes for the employees serving in the canteen shall be provided and maintained.
(2) A service counter, if provided, shall have top of smooth and impervious material.
(3) Suitable facilities including an adequate supply of hot water shall be provided for the cleaning of utensils and equipments.
(xiv) The food stuffs and other items to be served in the canteen shall be in conformity with the normal habits of the contract labour.

(xv) The charges for food stuffs, beverages, and any other items served in the canteen shall be based on No profit, No loss and shall be conspicuously displayed in the canteen.

(xvi) In arriving at the price of food stuffs and other articles served in the canteen, the following items shall not be taken into consideration as expenditure, namely:—
(a) The rent of land and buildings;
(b) The depreciation and maintenance charges for the building and equipments provided for the canteen;
(c) The cost of purchase, repairs and replacement of equipments including furniture, crockery, cutlery and utensils;
(d) The water charges and other charges incurred for lighting and ventilation;
(e) The interest and amounts spent on the provision and maintenance and equipments provided for in the canteen.
(xvii) The accounts pertaining to the canteen shall be audited once every 12 months by registered accountants and auditors.

10. ANTI-MALARIAL PRECAUTIONS

The contractor shall at his own expense, conform to all anti-malarial instructions given to him by the Engineer-in-Charge including the filling up of any borrow pits which may have been dug by him.

11. The above rule shall be incorporated in the contracts and notices inviting tenders and shall form an integral part of the contract.

12. AMENDMENTS

Government may, from time to time, add to or amend these rules and issue such directions as it may consider necessary for the purpose of removing any difficulty which may rise in the administration thereof.

III (5) - CONTRACTORS LABOUR REGULATIONS

1. Short Title: These regulations may be called the "Department of Atomic Energy "Contractors Labour Regulations".

2. Definitions:

i) **"Workman"** means any person employed by the Department of Atomic Energy or its Contractor directly or indirectly through a sub-contractor, with or without the knowledge of the Department of Atomic Energy, to do any skilled, semi-skilled or unskilled manual, supervisory, technical or clerical work for hire or reward, whether the terms of employment are expressed or implied but does not include any person –
a) Who is employed mainly in a managerial or administrative capacity; or

b)Who, being employed in a supervisory capacity draws wages exceeding five hundred rupees per mensem or exercise either by the nature of the duties attached to the office or by reason of powers vested in him, functions mainly of managerial nature;

c) Who is an out worker, that is to say, a person to whom any article or materials are given out by or on behalf of the principal employer to be made up, cleaned, washed, altered, ornamental finished, repaired, adopted or otherwise processed for sale for the purposes of the trade or business of the principal employer and the process is to be carried out either in the home of the out worker or in some other premises, not being premises under the Control and management of the principal employer.

ii) **"Fair Wages"** means wages whether for time or piece work fixed and notified under the provisions of the Minimum Wages Act from time to time.

iii) **"Contractors"** shall include every person who undertakes to produce a given result other than a mere supply of goods or articles of manufacture through contract labour or who supplies contract labour for any work and includes a sub-contractor.

iv) **"Wages"** shall have the same meaning as defined in the payment of wages act.

3) (i) Normally working hours of an adult employee should not exceed 9 hours a day and in case of a child 41/2 hours a day. The working day shall be so arranged that inclusive of interval for rest, if any, it shall not spread over more than 12 hours on any day.

(ii) 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 over time for the extra hours put in by him at double the ordinary rate of wages. Children shall not be made to work extra hours.

(iii) a) Every worker shall be given a weekly holiday normally on a Sunday, in accordance with the provisions of the Minimum Wages (Central) Rules, 1960 as amended from time to time irrespective of whether such worker is governed by the Minimum Wages Act or not.

(iii) b) Where a Minimum Wages prescribed by the Government under the Minimum Wages Act are not inclusive of the wages for the weekly day of rest, the worker shall be entitled to rest day wages at the rate applicable to the next preceding day, provided he has worked under the same contractor for a continuous period of not less than 6 days.

(iii) c) Where a contractor is permitted by the Engineer-in-Charge to allow a worker to work on a normal weekly holiday, he shall grant a substituted holiday to him for the whole day on one of the five days

immediately before or after the normal weekly holiday and pay wages to such worker for the work performed on the normal weekly holiday at over time rate.

4. Display of Notice regarding wages etc.:

The contractor shall 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 languages spoken by the majority of the workers, giving the minimum rates of wages fixed under the Minimum Wages Act, the actual wages being paid, the hours of work for which such wages are earned, wage periods, dates of payment of wages and other relevant information as per ***Annexure - A.***

5. Payment of Wages:

(i) The contractor shall fix wage periods in respect of which wages shall be payable.

(ii) No wage period shall exceed one month.

(iii) The wages of every person employed as contract labour in an establishment or by a contractor where less than one thousand, such persons are employed shall be paid before the expiry of the seventh day and in other cases before the expiry of tenth day after the last day of the wage period in respect of which the wages are payable.

(iv) Where the employment of any worker is terminated by or on behalf of the contractor, the wages earned by him shall be paid before the expiry of the second working day from the date on which his employment is terminated.

(v) All payments of wages shall be made on a working day at the work premises and during the working time and on a date notified in advance and in case the work is completed before the expiry of the wage period, final payment shall be made within 48 hours of the last working day.

(vi) Wages due to every worker shall be paid to him direct or to other person authorised by him in this behalf.

(vii) All wages shall be paid in current coin or currency or in both.

(viii) Wages shall be paid without any deductions of any kind except those specified by the Central Government by general or special order in this behalf or permissible under the payment of Wages Act, 1956.

(ix) A notice showing the wages period and the place and time of disbursement of wages shall be displayed at the place of work and a copy sent by the contractor to the Engineer-in-Charge under acknowledgement.

(x) It shall be the duty of the contractor to ensure the disbursement of wages in the presence of the Engineer-in-Charge or any other authorised representative of the Engineer-in-Charge who will be required to be present at the place and time of disbursement of wages by the contractor to workmen.

(xi) The contractor shall obtain from the Engineer-in-Charge or any other authorised representative of the Engineer-in-Charge as the case may be, a certificate under his signature at the end of the entries in the "Register of wages" or the "Wage-cum-Muster Roll" as the case may be in the following form : "Certified that the amount shown in column No. _____ has been paid to the workmen concerned in my presence on _____ at _____

6. Fines and deductions which may be made from wages:

i) 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 where by the terms of him employment he is required to work. The amount of deduction 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, advances granted shall be entered in a register.

e) Any other deduction which the Central Government may from time to time allow.

ii) No fines should be imposed on any worker save in respect of such acts and omissions on his part as have been approved of by the Chief Labour Commissioner.

Note: An approved list of acts and omissions for which fines can be imposed is enclosed as ***Annexure - I***.

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 deductions.

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 total wages, payable to him in respect of that wage period.

v) No fine imposed on any worker shall be recovered from him by installment, or after the expiry of sixty days from the date on which it was imposed.

vi) Every fine shall be deemed to have imposed on the day of the act or omission in respect of which it was imposed.

7. Labour Records:

i) **Register of persons employed :** The contractor shall maintain a "Register of persons employed" on work on contract in Form XIII of the CL (R & A) Central Rules, 1971 (***Annexure - B***).
ii) **Muster Roll** : The contractor shall maintain "Muster Roll" in respect of all workmen employed by him on the work under the contract in form XVI of the CL (R & A) Rules, 1971 (***Annexure - C***).
iii) **Wage Register:** The contractor shall maintain "Wage Register" in respect of all workmen employed by him on the work under the contract in form XVII of the CL (R & A) Rules, 1971 (***Annexure - D***).

iv) **Register of accidents:** The Contractor shall maintain a register of accident 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) Time and date of accident.
g) Date and time when admitted in Hospital.
h) Date of discharge from Hospital.
i) Period of treatment and result of treatment.
j) Percentage of loss 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.
v) **Register of Fines:** The contractor shall maintain a **"Register of Fines"** in the form XII of the CL (R & A) Rules, 1971 (***Annexure - H***).
vi) **Register of deductions for damage or loss: The** contractor shall maintain a **"Register of deductions for damage or loss"** in the form XX of the CL (R & A) Rules, 1971 (***Annexure - J***).
vii) **Register of Advances:** The contractor shall maintain a **"Register of Advances"** in the form XXI of the CL (R&A) Rules, 1971 (***Annexure - K***)
viii) **Register of overtime:** The contractor shall maintain a **"Register of Overtime"** in the form XXIII of the CL (R & A Rules, 1971 (***Annexure - L***).

8. Attendance Card-cum-Wage slips:

i) The contractor shall issue an **attendance card-cum-wage** slip to each workmen employed by him in the specimen format (***Annexure - E***).
ii) The card shall be valid for each wage period.

iii) The contractor shall mark the attendance of each workman on the card twice each day, once at the commencement of the day and again after the rest interval, before he actually starts work.
iv) The card shall remain in possession of the worker during the wage period under reference.

v) The contractor shall complete the wage slip portion on the reverse of the card at least a day prior to the disbursement of wages in respect of the wage period under reference.
vi) The contractor shall obtain the signature or thumb impression of the worker on the wage slip at the time of disbursement of wages and retain the card himself.

9. Employment Card: The contractor shall issue an **Employment Card** in Form XIV of the CL (R & A) Central Rules, 1971 to each worker within three days of the employment of the worker (***Annexure-F***).

10. Service Certificate : On termination of employment for any reason whatsoever the contractor shall issue to the workman whose services have been terminated, a **service certificate** in form XV of the CL (R & A) Central Rules, 1971 (***Annexure - G***).
11. Preservation of Labour Records: All records to be maintained under Regulations Nos. 6 and 7 shall be reserved in original for a period of three years from the date of last entries made in them and shall be made available for inspection by the Engineer-in-Charge, Labour Officer or any other officers authorised by the Department of Works & Housing in this behalf.

12. Power of Labour Officers to make investigations or enquiry: The Labour Officer or any other person authorised by 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 Wages Clauses and the Provisions of Regulations. He shall investigate into any complaint regarding the default made by the contractor or sub contractor in regard to such provision.

13. Report of Labour Officer : The Labour Officer or other person authorised as aforesaid shall submit a report of result of his investigation or enquiry to the Engineer-in-Charge concerned indicating the extent, if any to which the default has been committed with a note that necessary deductions 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 13 of these regulations, actual payment to labourers will be made by the Engineer-in-Charge after the Chief Engineer has given his decision on such appeal. a) The Engineer-in - Charge shall arrange payments to the labour concerned within 45 days from the receipt of the report from the Labour Officer or the Chief Engineer as the case may be.

14. Appeal against the decision of Labour Officer: Any person aggrieved by the decision and recommendations of the Labour Officer or other person so authorised may appeal against such decision to the Chief Engineer concerned within 30 days from the date of decision, forwarding simultaneously a copy of his appeal to the Engineer -in-Charge 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 in 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 referred to in clause (a) is affiliated.
c) Where the employer is not member of any registered trade union, by an officer of a 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 a federation of associations of employees to which association referred to in clause (a) is affiliated.
c) Where the employer is not a member of any association of employers, by an officer of association of employer, connected with, or by any other employer engaged in the Industry in which the employer is engaged.

iii) No party shall be entitled to be represented by a legal practitioner in any investigation or enquiry under regulations.

16. Inspection of Books and slips : The contractor shall allow inspection of all the prescribed labour records to any of his workers or to his agent at a convenient time and place after due notice is received or to the Labour Officer or any other person, authorised by the Central Government on his behalf.

17. Submission of returns: 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 any question as to the application, interpretation or effect of these regulations the decision of the Chief Engineer concerned in that behalf shall be final.

III (6) - PERFORMA OF REGISTER

ANNEXURE- A

LABOUR BOARD

Name of work _____

Name of contractor_____

Address of contractor _____

Name and address of Division _____

Name and address of Labour Officer _____

Name and address of Labour Enforcement Officer _____ _____

Date _____

Sr. No.	Category	Minimum wage fixed	Actual wage paid	Number present	Remarks

Weekly holiday _____

Wage period _____

Date of payment of wages _____

Working Hours _____

Rest Interval ----------

ANNEXURE-B

Form XIII

REGISTER OF WORKMEN EMPLOYED

Sr. No.	Name and Surname of Workmen	Age And Sex	Father's/ Husband's Name	Nature of Employment/ designation	Permanent Home address of the workmen (village, Ta, & District)	Local Address	Date of commencement of employment	Signature of thumb impression of the workman	Date of Termination of employment	Reason for Terminati on	Remark
1	2	3	4	5	6	7	8	9	10	11	12

ANNEXURE – C

FORM XVI

MUSTER ROLL

Name and address of contractor:

Name and address of establishment in/under which contract is carried on:

Nature and location of work:

Name and address of Principal Employer:

For the month of/fortnight:

SI No.	Name of Workman	Father's/Husband Name	Sex	Date					Remark
1	2	3	4	5					6
				1	2	3	4	5	

ANNEXURE- D

FORM XVII

REGISTER OF WAGES

Name and address of contractor:

Name and address of establishment in/under which contract is carried on:

Nature and location of work:

Name and address of Principal employer:

Wage period: Monthly/Fortnightly

SI NO	Name of Workman	Serial No. in the register of workmen	Designation/ nature of Work Done	No. of Days worked	Units of Work done	Daily Rate of wages/ piece rate	Amount of Wages Earned						Net Amount Paid	Signature of thumb impression of the workman	Initial of contractor or His Repetitive
							Basic Wages	Dearness Allowance	Overtime	Other cash Payment (nature of Payment to be Indicated)	Total	Deductions if any (Indicate Nature)			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

ANNEXURE-E

WAGE CARD

Wage Card No.:

Name and address of contractor:

Date of issue :

Name of work with location:

Name of workman:

Rate of wages :

Date of issue :_____ Designation_____ Month/fortnight_____

1. 2. 3. 4. 5 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21.22. 23. 24. 25. 26. 27 28 29. 30. 31	
Morning: Rate:	Rate:
Evening: Amount:	Amount:
Initial:	

Recivedfrom_____the sum of Rs._____on account of my wages

The wage card is valid for one month from date of issue. Signature

FORM XIX

WAGE SLIP

Name and address of contractor: _____

Name and Fathers/Husbands name of workman: _____

Nature and location of work: _____

For the Week/Fortnight/Month ending: _____

1. No. of days worked: _____

2. No. of units worked in case of piece: _____ rate workers

3. Rate of daily wages/piece rate: _____

4. Amount of overtime wages: _____

5. Gross wages payable: _____

6. Deductions, if any: _____

7. Net amount of wages paid _____

Initials of the contractor or his representativ

ANNEXURE F

FORM XIV

EMPLOYMENT CARD

Name and address of contractor: _____

Name and address of establishment in/under: _____ _____ which contract is carried on

Name of work and location of work: _____

Name and address of Principal employer: _____

1. Name of the workman: _____

2. Sl. No. in the register of workman: _____ employed

3. Nature of employment/designation: _____

4. Wage rate (with particulars of unit in: _____ case of piece work)

5. Wage period: _____

6. Tenure of employment: _____

7. Remarks: _____

Signature of contractor

ANNEXURE G

FORM - XV

SERVICE CERTIFICATE

Name and address of contractor:

Name and address of establishment in/under which contract is carried on

Name and location of work:

Name and address of workman

Name and address of principle employer

Age or Date of birth

Identification marks

Father / husband's Name

SI NO	Total Period for which employed		Nature of Work Done	Rate of wages (With particulars of Unit in case of Piece Work)	Remarks
	From	To			
1	2	3	4	5	6

ANNEXURE - H

FORM - XII

REGISTER OF FINES

Name and address of contractor:

Name and address of establishment in/under which contract is carried on:

Nature and location of work:

Name and address of Principal employer:

WAGES PERIOD: MONTHLY /FORTNIGHTLY

Sr. No.	Name of Workmen	Father's/ Husband's Name	Designation/ nature of work done	Act/omissi-on for which fine imposed	Date of offence	Whether workmen showed cause against fine	Name of person in whose presence explanation was heard	Wage period and wages payable	Amount of fine imposed	Date on Which fine realised	Remark
1	2	3	4	5	6	7	8	9	10	11	12

ANNEXURE - I

LIST OF ACTS AND OMISSIONS FOR WHICH FINES CAN BE IMPOSED:

In accordance with rule 5 of the Department of Atomic Energy Contractor's Labour

Regulations to be displayed prominently at the site of work in both English and local language.

1. Wilful insubordination or disobedience, whether alone or in combination with other.

2. Theft, fraud or dishonesty in connection with the contractors beside a business or property of Department of Atomic Energy.

3. Taking or giving bribes or any illegal gratifications.

4. Habitual late attendance.

5. Drunkenness fighting, riotous or disorderly or indifferent behaviour.

6. Habitual negligence.

7. Smoking near or around the area where combustible or other materials are locked.

8. Habitual indiscipline.

9. Causing damage to work in the progress or to property of the Department of Atomic Energy

or of the contractor.

10. Sleeping on duty.

11. Malingering or slowing down work.

12. Giving of false information regarding name, age, father's name etc.

13. Habitual loss of wage cards supplied by the employers.

14. Unauthorized use of employer's property for manufacture or making of unauthorized articles at the work place.

15. Bad workmanship in construction and maintenance by skilled workers which is not approved by the Department and for which the contractors are compelled to undertake rectifications.

16. Making false complaints and/or misleading statements.

17. Engaging on trade within the premises of the establishments.

18. Any unauthorized divulgence of business affairs of the employees.

19. Collection or canvassing for the collection of any money within the premises of an establishment unless authorized by the employer.

20. Holding meeting inside the premises without previous sanction of the employers.

21. Threatening or intimidating any workman or employee during the working hours within the premises.

ANNEXURE - J

FORM - XX

REGISTER OF DEDUCTIONS FOR DAMAGE OR LOSS

Name and address of contractor:

Name & address of establishment in/under which contract is carried On

Nature and location of work:

Name and address of Principal Employer:

Sr. No.	Name of Workmen	Father's/ Husband's Name	Designation/ nature of work emoly-ment	Particulars of damage or loss	Date of damage or loss	Whether workmen showed cause against deduction	Name of person in whose presence explanation was heard	Amount of deductio nimpose d	No. of Instalme nts	Date of Recovery		Re-mark
										First Instalme nt	Last Instalme nt	
1	2	3	4	5	6	7	8	9	10	11	12	13

ANNEXURE - K

FORM - XXII

REGISTER OF ADVANCES

Name and address of contractor:

Name & address of establishment in/under which contract is carried on

Nature and location of work

Name and address of Principal Employer:

Sr. No.	Name of Workmen	Father's/ Husband's Name	Designation/ nature of employment	Wage period and wages payable	Date and amount of advance given	Purpose(s) for which advance made	No. of Installments by which advance to be repaid	Date and amount of each installment repaid	Date on which last installment was repaid	Remark
1	2	3	4	5	6	7	8	9	10	11

ANNEXURE - L

FORM - XXIII

REGISTER OF OVERTIME

Name and address of contractor

Name and address of establishment in/under which contract is carried on:

Nature and location of work:

Name and address of Principal Employer:

Sr. No.	Name of Workmen	Father's/ Husband's Name	sex	Designation/ nature of employment	Dates on which overtime worked	Total overtime worked or production in case of piece rated	Normal Rate of Wages	Overtime rate of wages	Overtime earnigs	Rate on which overtime wages paid	Remark
1	2	3	4	5	6	7	8	9	10	11	12

ANNEXURE - M

PROFORMA FOR HINDRANCE REGISTER

REF: Para 28/11/01 CPWD Works Manual

Sr. No.	Nature of Hindrance	Item of works which could not be executed on account of the hindrance	Date of start of Hindrance	Date of removal of Hindrance	Over Lapping period if any	Net Hindrance in days	Signature of Eng.-In-Charge	Weightage of this Hindrance	Net effective Days of Hindrance	Sign of PD	Remarks of Reviewing officer
1	2	3	4	5	6	7	8	9	10	11	12

GOVERNMENT OF INDIA

BHABHA ATOMIC RESEARCH CENTRE

Nuclear Recycle Board, Tarapur

(SECTION – IV)

SPECIAL CONDITIONS TO CONTRACTS

IV (1) - SPECIAL INSTRUCTIONS TO TENDERERS

1. GENERAL

These special conditions supplement the General Conditions of Contract and shall be considered as part of the contract document. Where these special instructions are at variance with the corresponding conditions, stipulations, and specifications else wherein the tender document, these special instructions shall prevail. **Unless mentioned otherwise, the rates quoted by the contractor shall include the cost likely to be incurred by him to comply with the requirements stipulated in this section.**

2. SCOPE OF WORK

Name of work: - ".."

Location:- The proposed site of work is located at BARC ----------, Boisar which is about -------- Kms away from Boisar railway station (Western Railway).The site is also approachable from Mumbai -Ahmadabad national highway.

Scope of Work: - ----------.

General:-

1. The contractor will have to make their own arrangement for labour camp away from the campus. The department will not provide any land for the same.
2. Water & Electricity will be supplied as per Schedule 'B'
3. Security regulations:

   Please refer to the details with respect to Security Regulations at Tarapur as attached separately.

   Please note that the tenderer should taken into account all the requirements as detailed above and their tendered cost shall be deemed to include fully the above stipulations and no extraneous claims whatsoever shall be entertained by the Department on this account.

3. LAYOUT

The contractor shall layout his work from base lines in grids established by NRB and shall be responsible for all measurement and survey work in connection therewith. The contractor shall at his own expenses furnish all stakes, templates, platforms, equipment, arrange labour that may be required in setting or laying out any part of the work. The contractor shall be held responsible for proper execution of the work to such lines and grades as may be established or indicated in 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, theodolite, 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.

3A. DRAINAGE IN THE VICINITY OF THE BUILDING

The contractor shall be entirely responsible for the provision and maintenance of the efficient drainage arrangements in the work site to lead of all water whatever pumped from the excavation or on account of rains, springs or any other sources whatsoever. Flooding or bonding of water in the work site shall not be permitted under any circumstances whatsoever and the contractor shall take all precautions to prevent the same by providing suitable pump or other dewatering arrangements. The cost of repairing damages, if any, to the work under execution or to any Government property in and around the site shall be entirely borne by the contractor when such damages are due to non-compliance with the above conditions

3B. COMMENCEMENT AND COMPLETION OF WORK IN PROPER SCHEDULE

The entire work shall be completed within a period of (as specified in NIT/ Schedule F) months including monsoon period from fifteenth day from the date on of written order to commence the work. Time being the essence of the contract, a broad based time schedule showing the important phases of the work has been prepared by the Department for contractor's information and enclosed herewith. It will be necessary for the contractor to adhere to this program of work and he will have to prepare and submit detailed program of work and showing the various activities of work taking into consideration the departmental program. This program shall be submitted by the contractor within a fortnight of the acceptance of the tender for the approval of the Engineer-in-charge, which will then form part of the contract and the work is to be carried out in all respects as per time schedule. 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.

3C. SPECIFICATIONS AND DRAWING

a) The drawings furnished to the contractor shall be interpreted by the use of given dimensions and

nomenclature only, and the drawings shall not be scaled. Drawings to a large scale shall have precedence over those to a smaller scale.

b) Prior to the execution of the work the contractor shall check all drawings, specifications and shall immediately report all errors, discrepancies and /or omissions discovered therein to the Engineer-in-charge and obtain appropriate orders in the same. Any adjustments made by the contractor without prior approval of Engineer-in-Charge shall be at his own risk. Each description of item in the schedule of quantities shall be read in conjunction with the relevant drawings and specifications and the contractor's rate shall be deemed to be such complete work unless otherwise specified by the contractor while tendering.

c) Cost of all shop drawings, fabrication drawing of formwork drawings and details to be furnished by the contractor shall be deemed to be included in his tendered rates for the formwork. Approval of shop drawings shall not be considered as authorizing additional work of increased costs to the Department.

d) Prior to submission for approval, the contractor shall be responsible for thoroughly checking all drawings to ensure that they comply with the intent and the requirements of the contract specifications and that they fit in with the overall building layout. Drawings found to be inaccurate or otherwise in error will be returned for correction by the contractor.

e) For all drawings to be submitted by the Contractor for the approval of the Engineer-in-charge, the contractor shall submit 4 (four) copies of each drawings for approval.

f) The approval of the drawings by the Engineer-in-charge shall not be considered as a complete dimensional check, but will indicate only that the general method of construction and detailing is satisfactory. The contractor shall be responsible for the dimensions and design of adequate connection, supports, details & satisfactory construction of the work.

3D. TRAFFIC INTERFERENCE & INCONVENIENCE TO THE PUBLIC

The contractor shall conduct his operations so as to interfere as little as possible with the traffic. When interference to traffic is inevitable, notice of such interference shall be given to the Engineer-in-charge well in advance (at least 2 days). The contractor shall take all precautionary and other measures, such as providing warning signals, temporary diversions etc. all as directed by the Engineer-in-charge. The contractor shall exercise full care to ensure that no damage is caused by him or his workmen, during the operations, to the existing water supply and power lines. The cost of any such damage and risks arising out of this shall be entirely borne by the contractor. The contractor shall not deposit materials on any site which will seriously inconvenience the public. The Engineer-in-charge may require the contractor to remove any materials which are considered to be of danger or inconvenient to the public or cause them to be removed at the contractor's cost.

4. SPECIFICATIONS TO BE FOLLOWED

The work shall be carried out strictly in accordance with the contract specification. In the absence of any specification for any work or material, relevant Indian Standard Specifications will be applicable and where no Indian Standard Specification exists, relevant International Standard Specifications will apply. Further, in absence of any mention of specification in these specifications provided for the contract regarding work, material or workmanship, the decision of adaptability of relevant IS, BSS, American Standard Specifications or International standard etc, will be entirely at the discretion of Engineer-in-charge and the same shall be binding on the Contractor.

5. CLARIFICATIONS

The tenderer shall note that if any clarifications regarding specifications, conditions of contract, schedule of quantities, scope of work etc. are required, the tenderer should get it clarified prior to submission of bid document. No claim on account of any ambiguity in any respect will be entertained after the submission of the tender.

6. QUANTITIES

The schedule of quantities indicated in Schedule – "A" is only indicative and may vary. Payment will be made for actual quantities executed. Contractor's quoted rate shall remain firm for all such variation limits as specified under clause 11&clause 12 of Section-III General Conditions of Contract of the tender.

7. CARE IN SUBMISSION OF TENDERS

Before submitting the tender, the tenderer shall be deemed to have satisfied himself by actual inspection of the site, locality of the works, the geological and weather conditions of the site, approaches, availability of materials, camping facilities for the labour force etc. and ensure that all conditions liable to be encountered during the execution of the work are taken into account and that, the rates he quotes in the tender form are

adequate and all inclusive to comply with the provisions of the special and general conditions of the contract for the completion of the works to the satisfaction of the Engineer-in-charge.

The tenderers shall furnish following information along with their bids;

7.1 Tentative completion schedules each activity wise.

7.2 Details of proposed specialized agencies for various investigation works, duly indicating the specific tests each agency is likely to execute.

7.3 Safety measures proposed for work.

8. SITE INSPECTION

The tenderer shall satisfy 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 conformation and conditions of the ground character, the quality

and quantities of surface and subsurface materials to be encountered, including the sub-soil water level, the character of equipment/facilities needed, preliminary to and during the progress of the work, and all other matters upon which information is reasonable obtainable and which can in any way affect the work or his cost thereof under contract. Any failure of the contractor to acquaint himself with all the available information concerning these conditions will not relieve him of the responsibility of estimating properly, the difficulty or cost of successfully performing the work. The tenderer should visit the site at his own cost and familiarize himself with the site conditions, before submitting the tender. Non-familiarity with the site conditions shall not be considered as a reason for extra claims or for not carrying out the work in strict conformity with the drawings and specifications.

9. SPECIFICATIONS AND DRAWINGS

9.1 The work shall conform to the contract specifications enclosed in tender documents.

9.2 The work shall also conform to the drawings, and to such other drawings relating thereto as may be furnished from time to time by the Engineer-In-Charge in explanation of details or modifications, including such modifications as the Engineer-In-Charge may consider necessary to meet the conditions encountered during the execution of the work.

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

9.4 Generally the construction drawings will be issued three months prior to concreting of a particular pour for planning purpose. In case of delay in supply of drawings, the Contractor will be eligible for suitable extension of time only, if in the opinion of the Engineer-In-Charge (whose decision shall be final) such a delay has affected the progress of work. The grant of extension of time shall, however, be governed by the provisions of the General Conditions of Contract.

9.5 Prior to the execution of the work, the contractor shall check drawings and shall immediately report errors, discrepancies and/or omissions observed therein to the Engineer-In-Charge. All such errors, discrepancies and/or omissions will be addressed by the Engineer-In-Charge. Any adjustment done by the contractor without prior approval of the Engineer-In-Charge 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.

9.6 In case of difference between drawings and specifications, Para 8.1 of Section III General Conditions of Contract (GCC), shall be followed.

9.7 Concrete from bidders batching plant shall be supplied for departmental use and also for other agencies whenever recommended by NRB.

10. CONSTRUCTION PROGRAMME

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 the essence of the contract and shall be reckoned from the date indicated in the work order. On award of the work, the contractor shall submit a detailed construction time schedule, keeping the phasing of the work generally in line with the construction schedule proposed by NRB, for the approval of the Engineer-In-Charge which shall form the part of the contract. The contractor shall strictly adhere to such an approved program.

11. SECURITY RULES

It may be noted that the construction site is within the preview of the Security Section, BARC. The contractor shall follow at site all security rules as maybe framed by the Department from time to time regarding removal/movement of materials and equipment from site, issue of identity cards, control of entry of personnel and all similar matters. The contractor and his personnel shall abide by all security measures imposed by the Engineer-In-Charge or his duly authorized representative from time to time. Contractor shall also follow all rules and regulations applicable to the area being declared/pronounced from time to time by the authorities or authority of existing Nuclear Recycle Board in the vicinity or any other statutory orders. Nothing extra will be payable on account of stoppage/hindrance of the work. The contractor, his employees and agents shall not disclose any information or drawings furnished to him by NRB. Any drawings, reports and other information prepared by the contractor/by NRB or jointly by both for the execution of the contract shall not be disclosed without the prior written approval of the Engineer-In-Charge. No photographs of the works or plant within the site premises will be taken without the prior written approval of the Engineer-In-Charge.

The identity cards/passes will be issued to the Contractor's staff and labour by NRB. Applicable penalty amount will be charged for issuing duplicate card in case of loss or damage of the card The Contractor shall complete the formalities like police verification etc. for their staff and labour as a precondition to issue of identity card/pass.

11.1. SECURITY REGULATIONS

The contractor has to follow strictly the security regulations prevailing in NRB Tarapur area from time to time especially in regard to working hours, movement of materials and entry permits. The security regulations in vogue are broadly as under:

1. The contractor shall make applications to the Engineer-in-charge everyday for issue of entry permits / photo passes for casual labourers to be deployed on the works.

2. On recommendation by the Engineer-in-charge, the contractor shall collect the required number, of tokens from the security Department and distribute the same among the authorized labour force. He shall also be responsible for accounting and surrendering of tokens issued by the Security department at the end of day's work. The tokens can be used only for short duration in the morning hours. In the event of loss or misplacement of tokens/vigil passes fee of Rs. 200/-for first instance/

Rs. 500/-for second instance/ Rs. 1000/-for third instance per token or as in vogue at time to time on the basis of police complaint will be levied.

3. The contractor shall make an application for the photo passes to be issued by the Security Department for his regular supervisory staff.

4. No persons other than those holding tokens or photo passes shall be normally be permitted to enter work site. In case, the contractor desires to bring any other personnel to the work site he shall obtain permission of Security Department well in advance through Engineer-in-charge.

5. All materials and articles brought by the contractor to the work site shall have to be declared at the security gate. Similarly no materials shall be taken out from the Department premises without proper gate pass, which will be issued by the Engineer-in-charge to the contractors on written request. It is to be noted that loading of contractors materials in vehicles and trucks shall be done in the presence of Department personnel. The contractor's representative will have to escort the materials till the security check is over.

6. For working on Saturdays, Sundays, Holidays and late hours even through permission will be accorded by the Engineer-in-charge, the contractor will have to make application to the Security Department also and keep them informed well in advance. Any breach of above security regulations and rules in force from time to time will be viewed seriously.

As a part of keeping Nation-wide vigil on Government Establishments, the Security set up in NRB also has been beefed up and accordingly the following restrictions are in force till further orders.

a) Any motor vehicle with or without any construction related materials will be given an entry permit to NRB premises after convincing the purpose of entry, if and only if it is accompanied by an authorized departmental employee throughout its movement within the premises.

b) The movement of contractor's Vehicle within NRB premises is restricted and normally one specified vehicle will be permitted for his personal movement at the discretion of the Engineer-in-charge during the contract period after thorough security verification. The contractor has to apply for such vehicle permit to the department through the Engineer-in-charge in the standard pro-forma, after receiving the Work Order.

c) Each Labourer has to give his/her bio-data in the standard pro-forma to the Department for obtaining the labour entry pass and normally such an entry pass will be issued only after a thorough verification of the bio-data.

d) The Department will make every possible arrangement to minimize the inconvenience to the contractor from security point of view. However, due to any unforeseen reasons, any delay, inconvenience or loss occurred to the contractor no claim for compensation whatsoever in nature shall be entertained by the Department. The above additional regulations are indicated only to make aware the contractor about the latest security set up in NRB premises.

11.2. INFORMATION REGARDING ACCIDENTS

The contractor is also to promptly report the case(s) of the accident(s) involving injuries to his worker(s) to the local Security Post / Security Officer.

11.3. The contractor, his employees and agents shall not disclose any information or drawings furnished to him by Government. All drawings, reports and other information prepared by the contractor/by the Government or jointly by both for the execution of the contract shall not be disclosed without the prior approval of the Engineer-in-charge. No photograph of the works or plant within the premises shall be taken without the prior approval of the Engineer-in-charge.

11.4. VERIFICATION OF CREDENTIALS OF CONTRACTOR'S PERSONNEL

(a) Contractors, their employees, workers and casual labourers:

It will be the responsibility of the contractor to produce police clearance certificate for himself and his employees / workers before seeking permission for entry into NRB area.

Police verification certificate submitted with respect to an individual will be treated valid for 3 years from the date of issue and on expiry of 3 years period; a fresh police clearance certificate will have to be produced.

Original police verification certificate should be attached to the initial application for temporary identity card and in case of further renewals within six months a Xerox copy of the same can be attached.

The contractor shall employ labourers only after due verification of their credentials and track of past record. They should maintain a register showing the particulars of labourers including their residential address and submit the same to the Project Engineer-in-charge periodically for verification. The contractor shall ensure that no labourer with criminal record in the past is employed on NRB works. If any labourer with undesirable antecedents is found to be employed, the contractor shall forthwith remove such labourers from the worksite on demand by the Engineer-in-charge. The contractor shall be held solely responsible in the event of any adverse report / enquiry from the law enforcing authorities.

It will be mandatory on the part of the Tenderer to obtain Police Verification Certificate for their Engineer-in-charge, Supervisors and authorized representative, who reauthorized to draw tokens/passes for day today works inside NRB Campus. Tenderers are requested to take advance action to obtain Police verification Certificate for their authorized representative who desire to obtain photo passes, so as to avoid delay in commencement of work & also for issue of photo passes.

(b) Representatives of firms:

Representatives of firms who are required to visit NRB for supplying materials will not be issued

with identity cards. They will be given entry by issuing entry permission on day to day basis.

12. EMERGENCY PREPAREDNESS DRILL

NRB perform mock emergency exercises regularly in line with stipulations defined by regulatory bodies as a part of emergency preparedness. All the contractor's workmen may have to undergo awareness programs on emergency preparedness which shall be arranged by NRB. The contractor's workmen may require assembling in the identified areas and registering their presence for accounting purpose. The prices quoted by contractor shall include the cost of such interruptions.

13. TEMPORARY APPROACH ROADS

The contractor shall construct and maintain at his own cost, the required temporary access roads and approaches to the work site, offices, workshop, and dumping yard etc. and in his camp area, with the prior approval of the Engineer-In-Charge. The contractor may use the roads formed by the ~~Corporation~~ department in the vicinity of the works for transport of equipment and materials. All roads at the work site including any road formed by the contractor shall also be used by the project, other contractors and agencies at site and the contractor is not entitled for any payment as compensation on this account. Contractor shall clean the spillover concrete and the other materials over the roads used by him regularly and take necessary action to avoid dust hazard by regularly sprinkling water on the road at his own cost.

14. WATER

Water will be made available to the contractor at site at one place on the main line to be determined by the Engineer-in-charge. The contractor shall make his own arrangements for drawing water from the main. He shall bear the cost of making all connections, boosting water, laying all the pipe lines, installing a tested meter of approved make, maintaining all installations and dismantling the same on completion of work and making good any damage due to such piping of work and its removal. The meter shall be provided with masonry chamber, with a lid and locking arrangement. The contractor shall pay for all the water drawn by him at the rate specified in Schedule 'B'. In case it is observed that the water meter is out of order the consumption of water for the period during which the meter was out of order shall be worked out on the basis of 1 % of the cost of items of construction requiring water, during the said period. The contractor shall provide at his own cost adequate storage of water required for his work and drinking for the labour to tide over temporary stoppage in the supply of water. No claims for any help of work in this account will be entertained.

15. REPLACEMENT OF METRIC UNITS BY BRITISH EQUIVALENTS

Wherever dimensions for materials, fittings fixtures to be used in work are given in metric units, materials with nearest British dimensions may be used with specific prior approval of the Engineer-In-Charge. No extra claim or variation in the rates will be entertained on account of this change.

15A. VARIATION IN DIFFERENT GRADES /SECTIONS OF REINFORCEMENTAND STRUCTURAL STEEL

Use of different Grades /Sections of structural, grades/diameter of reinforcement steel will be solely guided as shown in drawing/ specifications. Payment will be made for bending and placing in position/fabrication, on the basis of weight in tones as per rates included in the schedule of Quantities and Rates, irrespective of type of steel used. No additional payment shall be made on account of variation in diameters, change in type and grades of steel. If the contractor proposes to use higher section or diameter of steel due to non-availability of the required section in his stores/market, Engineer-In-Charge may permit the same based on the technical acceptability. In case the required section/diameter is not available in the Contractor's store but available in market and the Contractor wishes to use the available higher sections/diameters in their stores, the payment shall be restricted to the weight involved as per the drawing. In case the required section/diameter is available neither in the Contractor's store nor in the market, the payment will be made based on the higher section/diameter permitted for use. However, the contractor shall take prior written approval of the Engineer-In-Charge before taking any action to supply or use the alternate section. The payment of the steel shall be made as per the theoretical weight as per Technical Specifications of relevant item given in Section – V. No claim due to difference in the weights due to rolling margin shall be entertained.

16. OPENINGS IN FORMS

Tenderer shall note that a number of holes and openings will have to be provided in the forms to enable various embedment's and reinforcing bars to be fixed by the Contractor in position in concrete and such holes and openings will have to be formed by him without any extra payment. In heavy concrete vault, number of embedments for thermocouples, piping, radiation monitors, instrumentation etc, will have to be embedded by the Contractor. The carbon/ stainless steel-liners on the inside face of vault; cell and pool wall will be installed and welded in position by the Contractor to the required specification. No reinforcement bar will be cut or hot bent without specific approval of Engineer In Charge-in-charge for placement of embedments and for any other work.

17. SURVEY OF EMBEDDED PARTS

The Contractor shall ensure that all embedded parts as finally embedded and concrete finishes are within specified tolerances as shown in the drawings/ specifications. In case of variations the Contractor shall submit a procedure for rectification and after getting approval of the Engineer-In-Charge to the procedure, rectifications shall be carried out by the Contractor at his own cost. After the completion of concrete placement operation the Contractor shall resurvey all the critical embedded parts with reference to the finished concrete surfaces/grid line sand shall produce reports of survey of each such embedded part and concrete surfaces, giving there in its final location and tolerance attained vis-a-vis theoretical required. Details of critical embedded parts / areas where critical tolerances and finishes are required for the concrete surface shall be indicated by the Engineer-In-Charge from time to time.

18. MAINTENANCE OF CLEAN SITE CONDITION

During the construction stage the Contractor shall keep the entire site in neat and tidy conditions by proper housekeeping & stacking of construction materials at the construction site and will

remove all debris and waste material from the site regularly. The curing water shall be constantly removed from various floors by adopting temporary dewatering scheme in the buildings and maintain the site in hygienic condition. Accumulation and piling of construction materials /debris/ tool boxes will not be permitted except only at the locations approved for this purpose. Construction material required for use for next 3 days only shall be stacked in the building keeping a clear passage for movement of personnel. The service lines viz. water, air, power cable, welding lead etc. shall not run on the floor but shall be routed by providing hangers on the walls and ceiling. Special care shall be taken to prevent spread of concrete, curing water and construction material, etc to other areas where plant equipment is already placed. Contractor's site office for his Engineer-In-Charge and labour shall be established using the standard PORTA CABINS and no site office shall be allowed inside the building.

19. HOUSEKEEPING

Notwithstanding the fact that other contractors are working in the same area, it shall be the responsibility of the contractor to maintain general cleanliness in the area, till area is taken over by Engineer-In-Charge after reasonable completion of job. In order to maintain general cleanliness in the area, the contractor may take the help/assistance from the contractors working in the same area. It is expected that specific area (say floor n) shall be taken over by NRB for housekeeping purpose after concreting of slab n+2and after de-shuttering/removal of the items/debris. The specific attention of contractor is invited to the fact that non-compliance of this provision shall invite penalties. Necessary labour shall be deployed for housekeeping at no extra cost. It is also essential that contractor keeps all his moving machinery, vehicles, transit mixers; dumpers etc. during entry & exit to/ from plant site and to achieve this contractor shall make suitable arrangement for washing at his own cost.

20. CONTRACTOR TO PROVIDE LABOUR AND ASSISTANCE

The contractor shall provide necessary labour and assistance to the Engineer-in-charge for checking layout, alignments, levels and other survey works connected with execution of work and also of taking measurement for finished works at no extra cost to NRB. The Contractor will provide services of tower cranes along with crane operator and signal man and any other similar facility owned by the contractor to NRB. This facility will be used during the period when the crane is not in use by the main plant Contractor. Charges for such facility provided by the Contractor shall be paid on hourly basis at the mutually agreeable rates.

21. MODE OF MEASUREMENT

Mode of measurement when not specified in the tender shall be in accordance with relevant Indian Standard (IS) Specifications and in case the same is not spelt out in Indian Standard (IS), The Engineer-In-Charge decision shall be final and binding on the contractor.

22. VALIDITY OF RATE

The rates quoted by contractor shall be valid for a period as mentioned in the NIT. If any tenderer withdraws his tender within the validity period 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. The rate for all items of work shall unless specified otherwise, include cost of all labour, materials, tools & plant appliances, transport, equipment, taxes, duties, cess, contractor's supervision, overheads, profits and any other item which is necessary for the satisfactory completion of the job. Further, the rates quoted by the tenderer in the schedule shall also be inclusive of sales tax on all materials, sales tax on contract turnover, labourcess on building & construction works, octroi duty, excise duty and/or other duties levied by the Government or by other public bodies. Unless otherwise stated in the schedule of quantities, rates for all items shall be for the complete work including supply and installation of all materials. The contractor, when called for by NRB, shall furnish detailed analysis in support of the rates quoted by him against each item of the tender. NRB reserves the right to utilize the analysis thus supplied in setting any deviations or claims arising on this contract.

23. TAXES

23.1. ROYALTIES AND DUTIES

All quarry fees, royalties, GST and other duties/levies on materials brought by the contractor to the site, will be paid for by the contractor directly. Assistance of Engineer-In-Charge will be limited to the extent of issuing a certificate stating that the materials so brought to site have become the property of NRB. If the quarry falls in private land or Government land leased to private parties, the contractor shall obtain the permission of such private parties and shall pay the royalties and other charges to them. Any variation in the rates of taxes/duties mentioned above, from those prevailing at the time of tender opening shall be borne by contractor.

23.2 SERVICE TAX – Not applicable

The tendered rates shall be inclusive of all taxes excluding Service Tax. However, in respect of Service Tax, same shall be paid by the contractor to the concerned department on demand and it will be reimbursed to him by the Engineer-in-charge after satisfying that it has been actually and genuinely paid by the contractor.

23.3 WORKS CONTRACT TAX – Not applicable

The tendered rates shall be inclusive of Works Contract Tax (WCT).Any variation in the rate WCT during the execution of the contract within the contractual completion schedule from the rate of WCT (as indicated by tenderer in tender) prevailing at the tender opening date will not be

considered for reimbursement/ recovery.
The work done value shall include value of work as per Schedule of Quantities & Rates (SOQR), additional quantities, extra items, substituted items, price adjustment amount and net secured advance paid during the period under consideration.

Note - The tenderer shall submit their bid after taking into consideration all the taxes and duties and no concession on any account.

23.4 DEDUCTION OF INCOME TAX

As per Income-Tax Act1961, as amended by Ministry of Finance from time to time, Income Tax at the applicable rate, as notified, will be recovered on the gross value of work done from the R.A. Bills. A certificate for the amount so recovered will be issued by NRB to the contractor on demand.

24. LAND FOR LABOUR CAMP & ESTABLISHMENT

24.1 NRB shall give suitable and limited area of land for the establishment of office, workshop, batching plant within the DAE site. However contractor shall make his own arrangement for establishment of the labour camp at nearby distance from the site, including, the allied facilities like temporary housing for labour, Establishment, and labour force, street lighting, treatment, storage and distribution of water supply, sanitation, access roads, electrification and general cleanliness of his camps will be done by contractor at his own cost and all these arrangement will be subject to the approval of Engineer-in-charge prior to construction of camps.

24.2 NRB shall also give suitable and limited land within the fenced area for Contractor's timber and steel yards, aggregate yards, workshop, office, site office, godowns and for erection of equipments. All the arrangements will be subject to the approval of Engineer-In-Charge prior to setting up of such facility.

24.3 After completion of works contractor shall at his own cost promptly dismantle all the houses and all other structures and vacate the areas and restore the land to the original condition.

24.4 Contractor shall be solely responsible for security and safe storage of all his materials/ including the materials issued to him by NRB and all his establishments.
24.5 The Contractor shall provide adequate facilities for medical aid and treatment for his staff and workers engaged on the project, both at work site, as well as at the camp.

25. WATER SUPPLY

The contractor shall make his own arrangements for construction water supply and water to meet the domestic requirements for his employees/ workers at labour camp.

25.1 PLANT SITE

The contractor shall make his own arrangements for ensuring sufficient storage of water supplied by NRB. NRB shall meter the supply of water to the contractor. For this purpose, the contractor will be liable to install and maintain a tested and certified water meter duly approved by the Engineer-In-Charge. The meter shall be provided with masonry chamber, with a lid and locking arrangement. The contractor shall at his own cost arrange to receive and distribute the water and shall lay and maintain water supply lines to his construction site. He shall construct suitable storage tanks to meet at least 4 day's requirement at worksite. To ensure adequate water supply at all levels on the works for the purpose of construction, he shall install necessary pumps, for delivery of water at all levels with requisite pressure. Water supply scheme proposed by the contractor shall be subjected to the approval of the Engineer-In-Charge. The contractor shall provide necessary number and capacity of electrical/diesel operated high lift pumps to ensure supply of water at the highest point of the structure. To ensure uninterrupted water supply in the event of power failure, contractor shall install diesel pumps as a stand by measure. The contractor shall ensure availability of potable quality of water as specified in the specifications. Chemical analysis of the water should be carried out to verify the quality at contractors own cost. No boreholes for withdrawal of the water shall be allowed in the plant area. The contractor shall pay for all the water drawn by him at the rate specified in Schedule - A. In case it is observed that the water meter is out of order the consumption of water for the period during which the meter was out of order shall be worked out on the basis of 1 % of the cost of items of construction requiring water, during the said period.

The contractor shall provide at his own cost adequate storage of water required for his work and drinking for the labour to tide over temporary stoppage in the supply of water. No claims for any help of work in this account will be entertained.

25.2 LABOUR CAMP

The contractor shall make his own arrangements for withdrawal, storage and distribution of water supply for labour camp.

26. FIRE FIGHTING

The contractor shall make his own arrangements for fire fighting and fire prevention both at the construction site and at his camp. He shall have storage of adequate capacity dedicated to meet the fire fighting and fire prevention requirement, both at the construction site and labour camp at his own cost. The equipment and piping (buried underground) required for this purpose will be installed and maintained by the contractor during the entire construction period till the works are handed over to NRB. Fire hydrants shall be provided at every floor in every building under construction. In order to meet the requirements during the power failure, the contractor shall have adequate number(s) of stand-by diesel pumps to meet the requirement during the fire fighting, A

residual head of 7 Kg/sq.cm minimum shall be maintained at all times above the highest elevation of the structure. Not with standing this, the contractor shall be entirely responsible for the consequences arising due to fire, if it occurs during the period of construction and no payment will be made, or claim will be entertained on any account by the NRB. Fire fighting lines shall not be used for any other purpose. The cost of supply, erection, commissioning, operation, maintenance of the system shall be deemed to be included in the quoted rates. The detailed scheme to be followed is included in the drawings attached with this tender. The contractor shall furnish along with the tender the details of the measures he proposes to adopt for Fire Fighting / Fire Prevention works. The contractor shall also incorporate any additions/alterations in his Fire Fighting / Fire Prevention system as may be demanded by the Engineer-In-Charge based on the exigencies of the work.

The quoted rates against the items in schedule of quantities shall be deemed to have taken into account these measures for Fire Fighting / Fire Prevention. In case of emergency, the contractor shall permit the Engineer-In-Charge to use the contractor's Fire Fighting equipment for protecting material, work and equipment of NRB or other agencies working at site at no extra cost.

27. SUPPLY OF ELECTRIC POWER

Construction power supply will be made available on chargeable basis from 33/6.6KV/440 V outdoor sub-stations of NRB at a nominal system voltage of 440 volts at three locations in main plant area and in one location at camp area.

The Contractor shall also make his own arrangement of Diesel Generators to meet the requirement of electrical power during interruption in normal power supply. The tenderer shall furnish along with the bid the estimated requirement of electric power at plant site for the execution of the work in terms of maximum kWh demand.

Non-availability of regular power supply shall not be a reason for extension of time and /or extra payment. The NRB shall meter the supply of power to the contractor at his / their panel. For this purpose, the contractor will be liable to install and maintain a tested and certified duly approved by the Engineer-in-charge, Vector type energy meter, integrator type power factor meter and integrator type maximum demand meter at his own cost. Current transformer of 15 VA and 0.5 class accuracy and suitable ratio shall also installed and maintained by contractor (make of instrument shall be as per MSEB (Maharashtra State Electricity Board) approved make).The contractor shall make his own arrangement for the distribution of power to all his works from the point of supply mentioned in para above. It shall be the responsibility of the contractor to provide and maintain the complete installation on the load side of the supply with due consideration to the safety requirements of site. All cabling and installation shall be subject to the approval of the Engineer-in-charge / Safety Engineer-in-charge and shall comply in all respects with the appropriate statutory requirements given as follows:

a) Indian Electricity Act 1910 (as amended)
b) Electricity Supply Act 1948 (as amended)
c) Indian Electricity Rules. 1956 (as amended) and shall be subject to approval of the Engineer-In-Charge.
d) Latest MSEB regulations.

For this purpose, the contractor shall provide full specifications of the equipment and the layout drawing for approval. Approval of the Engineer-In-Charge does not absolve the contractor from complying with any or all other conditions laid down in this section. The Power supply will also be regulated as per terms and conditions of supply of the Maharashtra State Electricity Board.

The Contractor shall have to install a duly checked power factor meter in his/their panels and maintain average power factor of not less than 0.90. Additional charges shall be recovered from contractors monthly bills, levied as per MSEB tariff revised from time to time for power factor below 0.90.NRB will not be liable for any loss / damage to the contractor's equipments as are sult of variations in voltage or frequency or interruptions in power supply.NRB will also not be liable for any loss to the contractor arising from failure, interruption or stoppage of power supply or variation in voltage or frequency.

Recovery for the power supply for construction purposes at site shall be made from the running account bills of the contractor on the basis of actual consumption of connected load. Recovery towards construction power supply shall be at the rate given in Schedule-"B" Electricity charges. Power supply shall be subject to rules and regulations as applicable time to time for which contractor will not have any claim whatsoever. After completion of the work and after obtaining approval of the Engineer-In-Charge, the contractor shall promptly dismantle the power supply network erected by him. In case of any dispute, the MSEB terms and conditions shall be final and binding on the contractor.
The tenderers may submit along with their tenders the total approximate requirement of electric power that may be required by them for the execution of the work.

28. CONTRACTOR'S SITE ORGANIZATION

28.1 It is essential that the site organization is necessarily headed by an officer occupying a senior position in the organization and shall be vested with powers to take prompt decision. It is also incumbent upon the Contractor that the progress of the contract is reviewed once a month with the project authorities. In addition to the above, periodical reviews at management level shall also be conducted as and when required.
28.2 It is to be noted that the time is essence of contract and in order to meet the schedules and to meet targets the Contractor has to plan for work round the clock shift right from the initial stages. Necessary supervisory staff and the labour force shall be deployed in each shift to ensure that the schedules are met with.

28.3 The Contractor shall furnish along with the tender a detailed site organization he proposes to deploy on the works. The organization shall include the number and category of personnel of

different grades for supervisory works up to the grade of Foreman/Asst. Foreman. (The distribution of staff and personnel shall be building wise/schedule wise/activity wise).

28.4 The Contractor will also submit along with the tender his assessed phase wise, induction of skilled, semi-skilled, un-skilled work force of all categories for the satisfactory and timely completion of the contract. The skilled, semiskilled categories are khalasis operators for cranes, pumps, compressors, electricians and operators, attendants, licensed blasters, operators for shovels, dozers, transport vehicles etc.

29 LIABILITIES FOR LOSS, DAMAGE, ACCIDENT ETC.

During the execution of the contract, and until completion certificate is issued, the contractor will be fully liable to compensate all concerned, for any loss, damage or destruction of "works", structures, materials, plant &machinery, persons, property etc. Including third party risk arising due to causes attributable to the Contractor as may be decided by the Engineer-in-charge whose decision in this regard shall be final. No claim shall be made against NRB on this account. The contractor shall immediately on award of work, take out at his own cost a "Contractor's all risk insurance policy" for an amount equivalent to work order value plus the cost of free issue materials of the works with an insurer acceptable to NRB which shall include inter-alia the value of all material issued to him free of charge by the project under terms of contract wherein NRB shall be named as "co-assured". The taking out of such policy shall not in any way limit or diminish the responsibility of the Contractor for any loss or damage.
Bidders may also note that separate insurance policy has to be taken by the contractor, at his own cost, for entire period of contract for workmen compensation, his own materials, equipment and third party insurance which is not covered under said CAR policy.

30. PLANT AND MACHINERY

30.1 The tenderer should submit along with the tender, phase wise deployment chart of plant & machinery. He should also indicate all the technical specifications for special and conventional equipment viz. Type, capacity, and year of manufacture / purchase of the plant and equipment Technical specifications shall indicate the capacity of the tower cranes with its reach, clearance below the hook, capacities of other portable Tower / mobile cranes. Batching plants, crushing plants, ice plant, and refrigeration plant.
30.2 List of tentative requirement of equipment recommended by NRB for deployment is enclosed as guideline only. The tenderer should study the equipment list carefully with reference to schedule to achieve planned activities / overall schedules. The tenderer may suggest/recommend additions/substitutions/deletions with justification/ detailed calculations in support of his assessed equipment deployment.

30.3 The tower cranes, placer booms, concrete pumps and portable cranes shall meet the requirements of handling/placement of concrete, formwork, Reinforcement steel, prefabricated liner panels for pool wall & vault, structural steel, embedded parts, hatch blocks etc. required for the construction of the Reactor Buildings and other plant buildings covered under this tender at various elevations. The tenderer shall submit along with his bid the quantum and type of workshop machinery/equipments like welding sets, lathes, drilling machines, grinders, inspection tools and equipments both for construction works and to meet his own operation & maintenance requirement.

30.4 Notwithstanding the approval of equipment listed by the tenderer in his deployment chart, to enable timely completion of work, the contractor should also bring and deploy additional plants and equipment, at no extra cost to NRB, as may be deemed necessary by Engineer-In-Charge. The tenderer shall have two independent set-ups for production of normal and heavy concrete and also for crushing heavy and normal aggregates.

31. MOBILIZATION

Contractor shall mobilize site infrastructure viz. plant machinery, batching plant, crushing plant, ice plant, fabrication yards for formwork, Reinforcement steel, structural steel, embedded parts, concrete testing laboratory and personnel required for the satisfactory completion of the work as mentioned in tender document.

32. CONCRETE MIX DESIGN AND TESTING

32.1 All physical and chemical tests relating to fresh & hardened concrete and concrete making materials will be carried out by the Contractor at no extra cost. The Test laboratory shall have facilities of conducting tests on cement, mineral admixtures, coarse & fine aggregates, fresh & hardened concrete, NDT equipments, self compacting concrete, RCPT, bricks/ concrete blocks, rock, soil. All materials and manpower required for the test, such as aggregates, sand, cement, concrete and bricks etc. will be supplied by the contractor at his own cost to the site concrete testing laboratory or any other place as directed by the Engineer-In-Charge. However, the Engineer-In-Charge reserves the right to get the raw materials such as aggregates etc. tested in reputed laboratories and the cost of such test shall be borne by the contractor. All the associated work regarding conducting of tests and maintenance of record etc. shall be carried out by the contractor at his own cost. Contractor shall extend the facilities of testing to other contractors working at project after clearance from NRB. The settlement of payment/ charges for such testing shall be done directly with the respective contractor.
32.2 Two potential sources of sand have been identified from Tandulwari, Sonave & Bahadoli. The tenderer shall satisfy himself about the adequacy and quality of sand sources. He shall also investigate for additional sources of sand for the works, over & above what is mentioned. Written approval from Engineer-In-Charge for the quality of sand to be used is necessary. The natural sand will have to be washed if necessary as directed by Engineer-In-Charge. In case of inadequacy of the natural sand, the use of manufactured sand can be made after specific approval of the Engineer-In-Charge. Tenderer may make provision in his plants for the manufacture of sand from rubble. The

use of manufactured sand or natural sand or combination of manufactured and natural sand will be decided on the basis of suitability by the Engineer-In-Charge. The natural sand from the above sources may be permitted after washing and rewashing if required. The washed water of the natural sand shall be free from chlorides and sulphates, whose presence, if any, shall be checked with silver nitrate and barium chloride respectively. Only on the specific approval from the Engineer-In-Charge, sand shall be permitted for usage.

32.3 Sources of Rubble/coarse aggregate has been identified from the following four major different quarries within 50 Kms from NRB, Tarapur are.

a) PS Pawde & Sons

b) Adhikari Brothers

c) Dattakrupa Stone Crusher

d) Lucky Stone Crusher

Tenderer may also investigate additional quarries for which prior approval of Engineer-In-Charge to be taken.

32.4 Coarse and fine aggregates shall be screened and washed/rewashed if necessary.

32.5 The contractor shall note that use of self compacting concrete (SCC) using fly as his envisaged for certain buildings in the scope of work. Therefore, the contractor shall be well equipped to produce, transport, place and finish SCC.

32.6 Design of concrete mixes for the various classes of concrete as latest relevant IS codes will be made by the contractor in the concrete testing laboratory. The proportioning of aggregates, cement, water, admixture, ice etc. established by tests in the laboratory shall be adopted by the contractor. This does not, however, absolve the contractor of his responsibility to produce concrete of requisite quality, strength and other characteristics as specified. Variations of proportions of mixes may be made from time-to-time as site conditions and material properties change. However, under no circumstances will the mix design be altered by the contractor without the written permission of the Engineer-In-Charge.

32.7 The contractor shall as per specification and direction of the Engineer-In-Charge, arrange to transport concrete moulds required for testing purposes and other tools and plant for casting concrete specimens from laboratory or from any other site of works to Site of works and also render all help by way of deputing adequate labour, staff for sampling of concrete for slump, workability, temperature etc.; filling in moulds, storage, curing and delivering of moulds with concrete specimens, tools and plant to concrete laboratory or any other place if the site premises as directed by the Engineer-In-Charge at the contractor's cost.

33. USE OF AREA PENDING COMPLETION

The Engineer-In-Charge shall be at liberty at any time to put into beneficial use whole or any part of the work, he may desire to use, pending full completion and taking over of the same. The decision of the Engineer In Charge shall be final and binding on both the parties as to whether the pending items of work are minor or important and if the Engineer-in-charge certifies that the items to be competed are important, not withstanding anything contained in this, the taking over certificate shall not be issued unless all works have been fully completed to the satisfaction of the Engineer-in-charge. Such possession or use shall not be deemed to be an acceptance of any part of the contract.

34. RIGHTS OF OTHER AGENCIES

The contractor shall note that several other agencies may also be simultaneously working within and around the structures covered under the present contract. The contractor shall permit as directed by the Engineer-in-charge from time to time; such works to be carried out without any hindrance and fully co-ordinate his activities and extend all his co-operation to the other agencies working therein. In case of dispute in such coordination, the Engineer-in-charge's decision shall be final and binding on the contractor.

35. SAFETY MEASURES

To avoid possible accidents to staff and labour employed during execution of work, it is imperative to observe the safety code provisions specified under General Conditions of Contract, Safety Manual & AERB safety guide for construction and these shall be strictly followed. The contractor shall follow the safety regulations as prescribed in the tender and Indian Standards. He shall provide necessary safety appliances to his employees as instructed by the Engineer-in-charge /Safety Officer deputed by the Project depending upon the nature of work. Chains/ ropes or other lifting materials used for the suspension must be of adequate strength and suitable quality and shall be of tested quality. AERB Notification from time to time shall be strictly adhered to regarding the minimum safety measures to be adopted at the site. The requirement of industrial safety personnel at construction sites as per present notifications of AERB is as follows and the Contractor shall abide by the same.

Safety Officers: Qualifications: Degree in Engineering along with Diploma in Industrial Safety with min. 7 yrs experience.

Number-1 in each shift (minimum) If number of workers in a shift (including Contractors' workers) exceeds 1000, additionally 1 Safety Officer shall be appointed for every1000 workers. Safety Supervisors: Qualifications: Diploma in Engineering/ B. Scand Diploma in Industrial Safety with min. 3years experience.

Number-2 in each shift (minimum) If number of persons working in a shift (including Contractors' workers) exceeds 1000, additionally 1 Safety Supervisor shall be appointed for every500 workers. These safety personnel shall not be assigned any other responsibility.

The prime responsibility of the Contractor is to provide and maintain safe working conditions in their shops and at their work sites at all the times during the execution of the Contract. Following points shall also be adhered to during execution of contract:

a) The contractor shall prepare Construction Safety Manual covering all aspects related to safety specific to this contract in line with his Corporate Safety Manual, if available. Among other things, the manual shall also comprise of Safety Organization defining Roles and Responsibilities, Safety Training, Housekeeping,

Their Safety Organization having requisite Personnel with due qualification and being technically connected with the departmental safety organization at site, shall be responsible to take instructions from the Project Safety Organization and Project Line Managers concerning all safety related matters for due implementation. Contractors executing small value contracts shall deploy safety Supervisors/Coordinators working on the advice of departmental safety group.

b) It shall be bounden responsibility of the Contractor to deploy Task Performers, Supervisors and Workers on jobs, who are very well familiar with the safety requirements and safe working practices. For this purpose the Contractor shall implement an effective "**Induction Training Program**" for all the Task Performers prior to and during execution of the Contract. The induction training and retraining modules shall make the Task Performers fully aware of safe practices in working, and ensure their compliance with the safety practices, procedures and methods all the time.

c) Contractors shall ensure that all construction activities are performed following duly approved Procedures, methods and work instructions. All hazardous activities shall be duly identified, Procedures duly formulated for the same, approved and implemented, and continuously monitored for their effective implementation. Job Hazard Analysis (JHA) shall be undertaken, updated (if required) and documentation to this effect maintained.

d) The first aid centre, constantly manned by Medical attendant/attendants as per Schedule -F shall be established at site. Following is the list of equipment which shall be available in the first aid centre:

1. Bed - 1 No.
2. Treatment Cabin - 1 No
3. Treatment Chair - 1 No.
4. Water Tap and sink - 1 No.
5. Leg rest - 1 No.
6. Oxygen apparatus - 1 No.
7. Resuscitation apparatus - 1 No.
8. Stretcher - 1 No.
9. Cotton applicators - 2000 Nos.
10. Bandages of various types
11. Elastic rubber bands
12. Tourniquets
13. Antiseptics
14. Analgesics

e) The Contractors Safety Organization shall provide monthly safety statistics reports indicating man-hours worked, incidents and accidents if any, findings of safety inspections, training and SRDs etc. to Project Authorities.

f) All safety precautions as advised by the Engineer-In-Charge/Safety Officer are to be taken while at work. All the deployed persons of the contractor shall have relevant qualification and required experience of the concerned job.

g) Contractor's persons shall undergo medical check-up by any MBBS Doctor before taking up the work above 2.5 M. from ground level/floor level and submit the certificate in the prescribed form at the time of enrollment of workers in NRB. Such person shall be subjected to medical checkup once in 12 months with respect to (a) Vertigo (b) Epilepsy/fits and (c) other height related medical problems and shall be arranged by contractor at his own cost.

h) The contractor shall at all-time keep his work spots, site office and surroundings clean and tidy, free from dust, rubbish, scrap, surplus material and unwanted tools and equipments, all scaffolding and temporary structure shall be removed as soon as the job for which these are intended, are complete. The welding and other electrical cable shall be routed to allow safe traffic by all concerned. All equipment and materials to be taken inside the plant building shall be cleaned thoroughly before taking them inside as well as outside.

a) All waste generated in the process of execution of the work is to be deposited compiling with the procedure as per ISO: 14001, Environment Management System. Defaulter shall be penalized.

b) Optimum utilization of resources like water, energy, fuel & manpower etc.

c) All efforts should be made to minimize the waste generation in the process of the execution of the job.

d) Any waste generated during the course of execution of the job, efforts should be made to re-use it elsewhere in consultation with Engineer-in-charge of the work. If the waste generated during the

execution of the job cannot be re-utilized, it should be disposed in as per standard guidelines in Consultation with Engineer-in-charge of the work.

e) You shall ensure that all applicable legal and other requirements related to Environmental protection and pollution prevention are complied with.

f) You shall encourage the environmental benign methods while executing the job.

g) You shall ensure that all your workmen have attended the EMS Awareness Training Program on regular basis.

i) The contractor shall issue safety shoes and uniform to each worker. It is mandatory to wear safety shoes and uniform by contract workers at the project site. The cost of such safety measures shall be included by the tenderer in his rates quoted for various items in the schedule of quantities and rates.

Refer Construction Safety Manual as attached in www.barc.gov.in.

36. GOVERNMENT LABOUR ACTS / LAWS

The contract shall strictly follow 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 arrangements for Labour Security Insurance will have to be made by the Contractor at his own cost.

37. FAIR WAGES

The wage paid to the labourers shall not be less than the fair / minimum wages as fixed under any law, statutory rule or order from time to time. However, increase in the wages due to any statutory act or by rules framed there under by the Government or by local authorities during the currency of the contract or during any valid period of extension of contract shall not be considered reason for any reimbursement or extra claim. The bidder is deemed to have taken this aspect into consideration in his unit rates for various items of work covered under this contract. The notified rates of minimum wages as applicable to different categories of employees are given as under for the guidance of the tenderer.

CATEGORY RATES OF BASIC WAGES Applicable for TARAPUR

1. Unskilled : RS. 493.15 Per day
2. Semiskilled : RS. 512.38 Per day
3. Skilled : RS. 551.00 Per day

The rates are applicable for the period from 01/04/2019 onwards. The tenderer is advised to confirm the latest rate of minimum wages and special allowance, if any as declared by the State / Central Government on the date of submission of the tender. NRB/NRB, Tarapur is registered with Assistant Labour Commissioner (Central), under the Contract Labour (Regulation and Abolition) Act.

Note: The Contractor shall submit the labour report every month. The contractor shall strictly comply with all provisions of labour laws and subsequent statutory requirements in this regard. The contractor should take into account the provisions of the labour laws while quoting his rates.

38. LICENSE TO EMPLOY LABOUR

Contractor shall arrange labour license for the labourers employed by him directly or through one or more sub-contractors or agents or any other person, before he undertakes execution of the job. The Contractor shall get a license from the competent authority of the area where the work is undertaken under sub section 12(i) of the contract labour (Regulation& Abolition) Act, 1970, in case twenty or more workmen are employed by him directly or through one or more sub-contractors or agents or any other person, before he undertakes execution of the job.

39. PRESENTATION BY SUCCESSFUL BIDDER

The successful bidder is required to make a detailed presentation before commencement of job. The presentation shall include all the points relevant to execution of this contract. These are:

a) Construction Methodology
b) Plant and machinery
c) QA System
d) Safety System
e) Plant and camp infrastructure
f) Site organization
g) Resource management
h) Training

40. REMOVAL OF TEMPORARY WORK, PLANT & SURPLUS MATERIAL

The contractor shall at his own expense remove from the site and dispose off the temporary structure, including all false work and scaffolding, grid work, all plant and material and debris for which he is responsible, to the satisfaction of the Engineer-in-charge. The acceptance of work shall be subject to compliance of this condition by contractor.

41. TRANSPORT OF MATERIALS

All materials supplied by NRB either frees of cost or on recovery basis shall be issued from the stores located at Plant site. All rates shall include the rate for transport of these materials including loading, unloading stacking, safe custody accounting etc. Contractor shall provide sufficient storage area/godowns for storing reinforcement steel, structural steel, embedded parts, and cement for other items. Contractors are advised to note that some items such as polysulphide compound, epoxy paints are required to be stored in air-conditioned rooms.

42. MATERIAL TO BE SUPPLIED BY NRB

During the execution of the contract, if any of the items listed in the schedule of supply of materials, either on chargeable basis or free of charge is not available in the Engineer-in-charge's stores and in the opinion of the Engineer-in-charge it may result in delay incompletion of work, the Engineer-in-charge may allow the contractor to purchase/supply materials as per the specifications of NRB to the extent to keep the progress
of work or as may be deemed fit, by the Engineer-in-charge. The contractor shall be paid the actual amount for such purchase(s) including transportation costs on production of supporting vouchers/cash vouchers, bills etc. In addition to this actual cost, the contractor shall be eligible for 10% of the actual cost of purchase, towards storage, handling, overheads and profits.

43. MATERIAL SUPPLIED BY THE CONTRACTOR

All materials required for the work shall be supplied by the contractor from approved source. The bidder may please note that major items e.g. cement, reinforcement steel, paints, water stops, polysulphide caulking compound, high tensile steel etc. shall be procured directly from the manufacturers. Contractor shall supply free samples of material to be used on his works whenever asked for. Failure of any sample to pass the specified requirements for a particular use will be sufficient cause for rejection. The materials so rejected shall be removed from the site by the contractor immediately, failing which the same shall be removed by the Engineer-in-charge at the risk and cost of the Contractor. Major materials supplied for earlier projects from reputed manufacturers are mentioned below as a guideline. The quantities indicated are approximate and may change depending upon the actual work. Pre-qualification is not required for the procurement of materials if procured from the approved vendor's.

44. USE OF ROCK BOULDERS FROM STOCK PILES AT PLANT SITE

The Contractor will be allowed to select, load and transport at his own cost suitable excavated rock boulders, subject to availability, from the stockpile at plant site for use in concrete, RR masonry or soling only. A limited quantity may only be available. Recovery for the use of departmental excavated rock boulders will be adjusted from the Contractor's running bills on the basis of quantity of concrete, RR masonry and soling at the rate of Rs 400/-per cum of finished item. Recovery for concrete, masonry or soling will be based on volume paid as per measurement books. This item will be treated as fixed cost supplies/services for escalation.

45. CONSTRUCTION COMPLETION CERTIFICATE

As detailed in the scope and schedule of construction, this contract covers construction of complete civil and structural work and allied works in Main Plant. The Contractor shall complete the buildings in stages and hand over the floors after finishing in sequence of construction and order of priority given by Engineer-in-charge to take up the equipment installation and process system erection.

The site records shall contain following information.

1. Construction Methodology
2. List of Drawings
3. Procedures/QA Plan/Check List
4. Test Certificates for all materials used in the construction of the structure
5. In-situ/Lab test records on soil, rock
6. Geological mapping reports
7. Consolidation grouting report
8. Report of confirmatory geotechnical investigation
9. Qualification records for welding, splicing of rebars & reinforcement coupling
10. Test reports on continued performance/personal qualification on welding, splicing and reinforcement coupling
11. Qualification reports on all construction materials like water bars, paints, epoxy etc.
12. Test reports on structural steel, piping materials, sealing materials, paints etc.
13. Test reports on EPs and Tunnels (hydro/leak test)/EP fabrication reports
14. Pour cards
15. Batching plant records

i) Concrete requisition
ii) Starting slip
iii) Batch weight records, batching plant calibration records
iv) Slump and temperature casting of the samples (tests on fresh concrete)

16. In-situ test, if any, along with casting of specimens (during concreting)
17. Test records at laboratory periodical statistical analysis and charts
18. Post-concreting survey including floor levels
19. DCR and conformance reports
20. Reports on mock up, if any
21. Erection (certificates) reports – EPS and structural's
22. Test report on paint thickness etc.
23. QA (certificates) reports

24. As-built information including deviations
25. Correspondence with different agencies
26. Work completion reports/status reports
27. Audit and feedback reports
28. Procedure for calibration of lab equipment
29. Calibration reports of lab equipments
30. Personnel training and qualification reports
31. Any other reports/procedures desired by ENC to be incorporated in the file. The completed file shall be subjected to verification be Engineer-in-charge and periodic audit (6 months) by a committee constituted by NRB. After all the above information are compiled, verified by the Engineer-in-charge and certified for submission, the 'Construction Completion Certificate (CCC)' and 'System Transfer from Construction to Commissioning' in the prescribed format along with the System /Equipment History Docket shall be transferred for NRB records and reference. The cost towards preparation of CCC is deemed to be included in the quoted rates.

46. TRAINING

Plans shall be developed and implemented for timely selection and training of personnel to perform activities affecting quality, which shall form part of Contractor QA manual. All Personnel performing activities and processes shall have requisite basic education and qualification, relevant experience and proficiency required for carrying out a specific assigned task, and then the Personnel duly authorized. Where required by codes, standards, specifications or other specific requirements, Personnel performing activities affecting quality shall obtain necessary qualification/ certification and or re-certification/ re-qualification. These include welders and NDT Personnel. In many special areas/tasks as considered necessary by NRB procedures are established for the qualification of personnel on the basis of workmanship and/or any other criteria set. Personnel deployed for performing work and those for inspecting or verifying works shall be suitably trained and qualified to develop and maintain necessary proficiency in the areas of work assigned to them. All personnel involved in inspection and for non-destructive testing activities shall have knowledge of the requirements of the items, equipment, systems and of the applicable specifications and specific procedures. All such personnel shall be suitably qualified as per guidelines of BIS 13805 / SNT-TC-IA (issued by ASNT) / similar guidelines applicable for different levels of proficiencies. For activities where formal qualification requirements do not exist, suitable procedures shall be established for the qualification of personnel on the basis of workmanship and experience. Some of such identified activities are: Routine Testing of Concrete ingredients, Fresh and Hardened Concrete, Concrete Consolidation and Finishing, Steel structure fixing by bolting, Heat jointing of PVC Water stops / Pipes, Sand/shot blasting, Air/airless spray Painting etc. For the above purpose, the contractor shall establish a training center at site for the same. The trained manpower shall be given colour coding.

47. ONE COPY OF THE DRAWINGS TO BE KEPT AT SITE

One copy each of the drawings furnished to the contractor shall be kept by the contractor at the site and the same shall at all reasonable times be made available for inspection and used by the Engineer-in-charge and any other persons authorized by the Engineer-in-charge.

48. WORK TO THE SATISFACTION OF THE ENGINEER-IN-CHARGE

Save in so far as it is legally or physically impossible the contractor shall examine and complete and maintain the works in strict accordance with the entire satisfaction of the Engineer-in-charge and shall comply with and adhere strictly to the instructions and directions of Engineer-in-charge on any important matter concerning the work. The contractor shall take instructions and directions only from the Engineer-in-charge or his authorized representative.

49. WATCHING AND LIGHTING

The contractor shall in connection with the works provide and maintain at his own cost all lights, guards, fencing and watching when and where necessary or as required by the Engineer In Charge-in-charge and duly constituted authority for the protection of the workers or for safety and convenience of the public or otherwise.

50. CONFIDENTIALITY CLAUSES

I. Confidentiality: No party shall disclose any information to any Third party' concerning the matters under this contract generally. In particular, any information identified as" Proprietary" in nature by the disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing party. This clause shall apply to the sub-contractors, consultants, advisors or the employees engaged by a party with equal force.

II. "Restricted information" categories under Section 18 of the Atomic Energy Act, 1962 and" Official Secrets" Under Section 5 of the Official Secrets Act, 1923:Any contravention of the above-mentioned provisions by any contractor, subcontractor, consultant, adviser or the employees of a contractor, will invite penal consequences under the above said legislation.

III. Prohibition against use of NRB's name without permission for publicity purposes The contractor or Sub-contractor, consultant, adviser or the employees engaged by the contractor shall not use NRB's name for any publicity purpose through any public media like press, Radio, TV or internet without the prior written approval of NRB.

51. PROVISIONS UNDER CONTRACT LABOUR (REGULATION & ABOLITION) ACT 1970 REQUIRED TO BE FULFILLED BY CONTRACTORS.

1) Every Contractor employing 20 or more workmen on any day should obtain license from Asstt. Labour Commissioner, Sion, Mumbai. They should also obtain Registration under BOCW Act if they are engaged in construction activities. (Rule12).

2) Every Civil Contractor employing 10 or more workmen should obtain a Registration under Building and Other Construction Workers Act from Asstt. Labour Commissioner, Sion, Mumbai.

3) Notice of commencement of contract work should be given to Labour Enforcement Officer by the Contractor in from VI-A. {Rule~1(3)}.

4) Notice of completion of contract work should be given to Labour Enforcement Officer by the Contractor in Form VI-A. {Rule81 (3)}.

5) Notices showing rates of wages, hours of work, wage periods, date of payment of wages, date of payment of unpaid wages, names and addresses of Inspections in English, Hindi and in local language should be displayed at Work Site. {Rule 81 (i)}.

6) A copy of the above Notice is to be sent to Labour Enforcement Officer.
7) Maintain a Register of workmen in Form XIII. (Rule74).

8) Issue Employment Card to workmen in Form XIV. (Rule76).

9) Issue a Service Certificate to workmen in Form XV on termination of employment for any reason whatsoever. (Rule77).

10) Maintain Muster Roll of Workmen in Form XVI. {Rule78 (1) (a) (i)}.

11) Maintain Register of wages in Form XVII. Contractors may maintain a Combined Register of Wage-cum-Muster Roll, if the wage period is a fortnight or less.

12) Provide Wage slip to workmen in Form XIX. {Rule 78 (1) (b)}.

13) Maintain a Register of Deduction for Damage/ Loss in Form XX. {Rule 78 (1) (a) (ii)}.

14) Maintain a Register of Fines in Form XXI. {Rule 78 (1) (a) (ii)}.

15) Maintain a Register of Advances in Form XXII. {Rule 78 (1) (a) (ii)}.

16) Maintain a Register of Overtime in Form XXII. {Rule 78 (1) (a) (iii)}.

17) Send Half Yearly Return in Form XXIV to ALCILEO . {Rule 82 (1)}.

18) A first Aid Box with essential medical items to be maintained. (Rule 58).

19) Every contractor should ensure disbursement of wages to his workmen in the presence of authorized representative of NRB .(Rule 72).

20) Every contractor shall display an abstract of the Act and Rules in English, Hindi and in the language spoken by the majority of the workers. (Rule 79).

52. The **Escalation Clause 10 CA** will be applicable once the material is being utilized for the actual work. However indices of material covered under clause 10 CA will be applicable at the time of material brought to site.

53. ADDITIONAL CONDITIONS

1. MATERIALS OBTAINED FROM DISMANTLEMENT: The contractor in the course of their work should understand that all materials (e.g. stone and other materials) obtained in the work of dismantling excavation etc. will be considered Government property and issued to the contractor (if they require the same for their own use) at rates approved by the Chief Engineer. If they do not require these materials, they will be disposed off to the best advantage of Government.

2. DELAY IN OBTAINING MATERIALS BY THE DEPARTMENT: Owing to difficulty in obtaining certain materials in the open market, the Government has undertaken to supply materials as specified in Schedule' A' here to annexed rates states therein. There may be delay in obtaining the materials by the Department and the contractor is, therefore, required to keep himself in touch with day-to-day position, regarding the supply of materials from the Engineer-in-charge and to so adjust the progress of the work that their labour may not remain idle nor may there by any other claim due to or arising from delay in obtaining the material. It should be clearly understood that no claim whatsoever shall be entertained by the Government on account of delay in supplying materials. In case the materials included in schedule of supply of materials are not supplied by the Department and in case the use of such material is required in the works, the contractor with prior orders of the Engineer, for the use of such materials/ sections etc. from his own stocks or sources, may use of such materials of approved and tested quality. In all such cases the contractor shall produce the details of these materials such as quality, quantities including testing certificates and shall be entitled to claim extra payment for such use. The extra payment/ deduction would be the difference between the actual price (to be supported by vouchers) and the issue price.

3. Any damage to work resulting from rains or from any other cause until the work is taken over by

the Department after completion will be made good by the contractor at his own cost.

4. The contractor shall get himself acquainted with the nature and extent of the work and satisfy himself about the availability of quarry and of kiln for collection and conveyance of materials required for the construction. The contractor's quoted rate should take into account all these factors, and will not be allowed any extra lead for collection and conveyance of materials for any reasons whatsoever.

5. The contractor shall deposit royalty and obtain necessary permit for supply of Red Bajri, stone kankar etc. from local authorities

6. Security deposit should not be paid till clearance certificate from Labour Officer is obtained by Contractor.

7. No area shall be allotted by the Department for setting up of labour camp.

8. Labour Camp shall not be erected at the site of the work nor shall any Labour be allowed to live at site.

9. The contractor shall conform to the provision of any Government acts which relate to works and to the regulations and by laws of any local authorities. The contractor shall give all notices required by the said acts or laws etc. and pay all fees payable to such authorities and allow for those contingencies in his tendered rates including fees for encroachments, costs of restorations etc. and all other fees payable to the local authorities.

10. The contractor shall undertake to have site clean free from rubbish to the satisfaction of the Engineer-In-charge. All surplus materials, rubbish etc. will be removed to the place fixed by the Engineer-In-charge and nothing extra will be paid.

11. CONVENIENCE FOR DEPARTMENT'S ACTIVITIES: The contractor shall not deposit materials on any site which will seriously be inconvenient to any of the Department's activities. The Engineer-In-charge may require the contractor to remove any materials which are considered by him to be of danger or inconvenience to the activities of the department or cause them to be removed at the contractor's cost.

12. EMPLOYMENT OF CERTIFIED PLUMBERS: Certified plumbers should be employed by the contractor on the work for main sewer filtered and unfiltered main.

13. EMPLOYMENT OF LICENSED ELECTRICAL FOREMAN (for electrical works only) the contractor should employ a licensed electrical foreman to supervise the electrical works.

14. The contractor shall not employ a woman and man below the age of 18 on the work of painting with products containing lead in any form, where ever men above the age of 18 are employed on the work of lead painting, the following principles must be observed for use.

i)a) White lead, sulphate of lead, products containing these pigments shall not be used in painting operation except in the form of paste or paint ready for use.
b) Measures shall be taken in order to prevent danger arising from the application of paint in the form of spray.
c) Measures shall be taken wherever practicable to prevent danger arising from dust caused by the rubbing down and scrapping.

ii) a) Adequate facilities shall be provided to enable working painters to wash during and on cessation of work.

b) Suitable arrangements shall be made to prevent clothing put off during working hours being spoiled by painting materials.

c) Overalls shall be worn by working painters during the whole of the working period.

iii) a) Case of lead poisoning and of suspected lead poisoning shall be notified, and shall be subsequently verified by a medical man appointed by the Competent authority of NRB.

b) The NRB may require, when necessary a medical examination of workers.

c) Instructions with regard to the special hygiene precautions to be taken in the painting trade shall be distributed to working painters.

15. In any section of these specifications where item of material or equipment are specified by brand name, catalogue number or by names of manufacturers, the contractor is required to use the same material / equipment only. Equivalent to the material / equipment shall be acceptable (after reducing/increasing the rate to extent of difference in cost) in case of its non-availability and after confirming the same in writing from the manufacturer only with the written approval of Engineer-in-charge.

54. APPROVED TEST HOUSES BY NRB

1) NCCBM, BALLBHAGARH

2) CSMRS, NEW DELHI

3) CWPRS, PUNE

4) ACC, THANE

5) SERC, GHAZIABAD, CHENNAI

6) GML, BANGALORE

7) CBRC, ROORKEE

8) ESSEN & COMPANY, BANGALORE

9) SHRIRAM INSTITUTE FOR INDUSTRIAL RESEARCH, BANGALORE

10) GEOCHEM LABORATORY, MUMBAI

11) METALLURGICAL SERVICE LABORATORIES, MUMBAI

12) TORSTEEL RESEARCH FOUNDATION, BANGALORE

13) VJIT, MUMBAI

14) HIND HEAT TREATMENT, KOTA

15) INDIAN RUBBER MANUFACTURERS & RESEARCH ASSOCIATIONS,THANE

16) HBTI, KANPUR

17) NRB, MUMBAI

18) STRUCTWELL, MUMBAI.

IV (2) QUALITY MANAGEMENT REQUIREMENTS

1. SCOPE

This chapter specifies requirements to be incorporated in a Contractor's quality assurance program for construction. The contractor is responsible for planning and developing a program that assures that all his management; design and technical responsibilities for quality are incorporated and executed effectively. The program is aimed primarily at ensuring an efficient quality management in construction and taking corrective actions, when necessary.

2. QUALITY ASSURANCE

2.1 Assuring reliability and quality of work carried out under this package is the primary responsibility of the contractor. Contractor shall have a documentation quality system addressing the mechanism to achieve the required quality level and the work carried out conforming to the best manufacturing and work practices prevailing at the time of execution of contract.

2.2 Contractor shall have a well-structured organization of Personnel and resources to specify, achieve, verify and document all work. This should also include the approval from NRB wherever required. Quality system can be in line with National / International standards / models and shall address following areas.

- **a.** Design / Engineering whenever applicable.
- **b.** Procurement of consumable materials and Equipment's.
- **c.** Construction
- **d.** Subcontracting
- **e.** Special processes
- **f.** Measuring and Testing equipment
- **g.** Inspection and Test including non-destructive testing and other Examination of the material and equipment.
- **h.** Handling, Storing, Preservation, Packaging and Shipping.
- **i.** Item identification and Traceability
- **j.** Documentation and Quality records
- **k.** Disposition of non-conformances and Corrective action and Demonstrate
- **l.** Conformance of the work carried out meeting specified requirements

3. APPLICABILITY The requirements of this chapter apply to the construction activities when specified in a contract.

4. CONTRACTOR'S RESPONSIBILITIES

4.1 The Contractor / Vendor / Sub-vendors shall have an independent Quality Control Inspection and testing organization. They should also make provision for setting up a test facility wherever required. Personnel working in this group shall not have any other responsibility such as planning, safety and production. This department shall work in close co-ordination with the Quality Assurance Department of NRB and abide by their instructions in all aspects of work. The Quality Personnel performing all the package works are to be suitably academically qualified to have suitable professional experience in their relevant field. For example: NDE, Welding Technology, Metrology as applicable.

4.2 The Contractor shall furnish along with this bid an organization chart which includes the structure and size of the Manpower of the Quality Department for detailed scrutiny / approval and acceptance of NRB. Contractor's quality personnel shall be evaluated by NRB. Contractor Personnel found not suitable for performing the works shall be replaced immediately with efficient quality performers to ensure speedy execution of works without sacrificing quality.

4.3 Wherever found essential the contractor may have to provide for hiring outside inspection agency.

4.4 Following are the procedures to be developed to fulfill the above requirements.

- **a.** To develop and implement the controls and quality assurance procedures, that will promptly detect and dispose of, or prevent, non-conformances to contractual requirements.
- **b.** To comply with the NRB's requirements as specified in the contract.
- **c.** To prepare a quality assurance manual which shall be submitted for the Engineer-In-Charge's concurrence before the contract is awarded or at the latest before the work starts.
- **d.** To prepare a quality plan which shall be submitted to the Engineer-In-Charge before the work starts.
- **e.** To update and resubmit the quality assurance manual and quality plan to reflect current practices when significant changes occur in the contractor's program or organization in order to improve its effectiveness or to prevent recurrence of non-conformances.
- **f.** To initiate corrective measures promptly when any quality problems are identified or deviations from established requirements are noticed.

5. DEFINITIONS AND BASIC REQUIREMENTS

5.1 QUALITY ASSURANCE PROGRAMME - The contractor shall plan, establish, implement and maintain a quality assurance program that complies with the requirements of this chapter.

5.2 ORGANISATION - The contractor shall:

5.2.1 Clearly define management policies, objectives and responsibilities for quality assurance, including the responsibility of each division within a multidivisional organization. The responsibility and authority for quality of those managing and performing the work and of these auditing and verifying conformance to quality requirements shall be defined and their relationships shown on

organization charts.

5.2.2 Provide for the review by management of the status and adequacy of the quality assurance program.

5.2.3 Define the responsibility and authority of personnel who are primarily responsible for quality assurance and their organizational independence during audits and define the responsibility and authority of personnel who are primarily responsible for quality control and their organizational independence to:

- **a.** Identify and record quality problems
- **b.** Initiate or recommend or provide solutions through designated channels.
- **c.** Verify the implementation of dispositions.
- **d.** Control further processing, delivery or installation of a non-conforming, item or service until the deficiency or unsatisfactory condition has been resolved. Note that, generally, audit personnel shall not be within the pattern of daily activities.

5.2.4 When inspection/quality control is to be performed by Personnel other than authorized inspectors then such a provision should be made in the concerned quality plans and should also be got approved from NRB

5.3 QUALITY ASSURANCE DOCUMENTS

5.3.1 QUALITY ASSURANCE MANUAL - The Contractor shall:

A. Prepare a quality assurance manual, approved and signed by a senior management official, and submit it for the Engineer-in-charge's concurrence before the contract is awarded or at the latest before the work starts. A quality assurance manual submitted under a previous contract or tender may be referred to.

B. Review and update the manual to reflect current quality assurance policies and procedures and resubmit the resulting manual

C. Implement the program according to the provisions specified in the manual. The Quality Assurance Manual shall deal as appropriate with the following:

a. Organization – The manual shall define the organizational measures.

b. Quality plan – The manual shall identify the group responsible for the quality plant and define its main principles and features in adequate procedures.

c. Quality assurance procedures documented quality assurance procedures shall be included or shall be outlined and cross-referenced. Referenced QA procedures shall be made available to the quality assurance representative.

d. Manual review – A statement shall be incorporated for reviewing and updating the manual.

5.3.2 QUALITY PLAN - The Contractor shall

A. Plan the inspection and test activities.

B. Identify in the quality plan the inspections and tests to be performed on the items listed in the contract, in compliance with contractual and / or technical requirements.

C. Submit the plan for the Engineer-In-Charge's concurrence / approval following the award of the contract and before the work starts. Referenced inspection and test specifications and / or procedures shall be made available to the quality assurance representative during the implementation of the quality plan. This quality plan shall identify at appropriate stage witness points and hold points and also give clearly the acceptance standards for all inspections, tests and examinations performed.

D. Update the plan during the life of the contract to reflect current conditions of manufacturing, construction, inspecting and testing and resubmit the plan to the Engineer-in-charge. The Quality Plan shall be on a format to be approved by the Engineer-in-charge. The quality plan shall deal as appropriate with:

a. Identification of the characteristics or items to be inspected and tested.

b. Identification of required inspection, test and special process operations and their relative location in the construction cycle. The contractor may include additional in-process inspection points for his own evaluation of quality which will not be subject to acceptance and witness by the quality assurance representative.

c. Reference to inspection, test and special process procedures, standards, acceptance criteria and sampling plan, if any. Indications of hold points beyond which the activity shall not process until the required inspections or tests have shown satisfactory results and have been documented.

d. Provisions for the Engineer-In-Charge to insert witness points at which activities are to be observed. The activity may nevertheless proceed beyond a witness point should the Engineer-In-Charge fail to attend in spite of due notification. The quality plans for subcontracted items, when concurred with by the contractor, shall be submitted to the Engineer-In-Charge as applicable, for concurrence and insertion of witness and hold points.

5.3.3 QUALITY ASSURANCE PROCEDURES - The contractor shall have procedures for the following specific requirements should they apply to the contract:

a. Document control
b. Procurement
c. Measuring and testing equipment
d. Inspection and test
e. In-process inspection
f. Final inspection
g. Inspection status

h. Identification and traceability
i. Preservation, handling and storage during construction
j. Construction
k. Special Processes
l. Quality records
m. Non-conformances
n. NRB-supplied items
o. Corrective actions

Each QA procedure shall define, as applicable, such things as; its purpose and scope; who is responsible for what; how all steps are to be performed; what materials, equipment and documentation are to be used; how it is all controlled. **QA PROCEDURE SHALL BE UPDATED WHEN NECESSARY.**

6. SPECIAL REQUIREMENTS - The Contractor shall establish measures to ensure that all essential quality related documents including but not limited to those listed below are reviewed for adequacy and approved for release by authorized personnel:

a. Quality assurance manual
b. Quality plan
c. Quality assurance procedure
d. Design documents
e. Procurement documents
f. Calibration procedures
g. Inspection and test procedures
h. Manufacturing documents
i. Special process procedures

6.1 Establish distribution lists for the above-mentioned documents, update and maintain them in the current form to assure that the proper personnel are issued with all the documents necessary to perform the work.

6.2 Make the applicable issues of these documents available at areas where these activities are performed.

6.3 Establish and update lists of applicable documents for construction and distribute them systematically. Controlled distribution is required for these lists only.

6.4 Ensure that changes to documents receive the authorizations by the same organizations as the initial documents unless other organizations are specifically designated. Maintain a record of changes as they are made written notes or documents are acceptable provided that they are made by authorized persons according to established procedures. Documents shall be revised and re-issued after a practical number of changes have been issued.

6.5 Control shall be established for disposition and removal of obsolete drawings, Procedures and other documents so that they may not be inadvertently used for works.

7. PROCUREMENT

7.1 SELECTION OF SUBCONTRACTORS/ VENDORS - The contractor shall identify items to be procured. He shall undertake the following:

A. Determine for these subcontracted items the applicable quality management requirements. Classification of these quality management requirements shall be in such a way that the overall quality is not impaired. The classification list shall be submitted to the Engineer-In-Charge for acceptance.

B. Evaluate and select subcontractors in accordance with of the applicable quality management requirements with regard to their ability to meet subcontract and quality requirements and the process of selection should be uniformed to NRB. NRB reserves the right to reject such subcontractors who are not found suitable to carry out intended works.

C. When off the self - items are to be procured; evaluation of subcontractor may not necessarily be required. The contractor shall nominate to the quality assurance representative those materials, parts and components that belong to this category.

7.2 SUBCONTRACT REQUIREMENTS - The contractor shall include in subcontracts the following, as applicable:

A. A clear description of the items or services to be procured including technical data and inspection and test requirements by reference to standards, technical specifications, drawings, etc.

B. A Designation of the applicable Quality Management Requirements to be applied to the items and exceptions, if any.

C. A Designation of the Contractor's QA procedures to be implemented by the subcontractor, if applicable.

D. Instructions for the Submission, retention and disposition of quality records.

E. Requirements for packaging and shipping, where applicable.

F. A Statement related to the right of access to the subcontractors premises and records for audit and / or surveillance by the contractor or the Engineer-In-Charge.

G. Instructions for notification of witness points and hold points.

H. Requirement for the subcontractor to report non-conformances.

I. Applicable Requirements to be extended to lower tier subcontractor, if any. Subcontract document shall be reviewed and approved in accordance with

J. All un-priced subcontracts and associated reference data shall be made available on request for review by the quality assurance representative.

7.3 AMENDMENTS TO SUBCONTRACTS - The contractor shall process amendments to subcontracts in the same way as initial subcontract and reference the initial subcontract number in the amendments.

A. Verification of the Quality Management System Implemented by the subcontract. Refer Applicable Quality Management Requirements.
B. Receiving Inspection to the extent that is practical, receiving inspection shall be specified in the quality plan. The Contractor shall,
a. Identify and inspect items on receipt to ascertain that they comply with contractual requirements. In determining the amount or nature of receiving inspection, consideration shall be given to the surveillance exercised at source and documented evidence of quality conformance. Receiving inspection shall cover as a minimum verification of deterioration or damage during transport, identification control, and review of required documentation.

b. Hold Incoming items until the required inspection and / or test have been completed or the necessary inspection and / or test reports have been received and verified except when items are released under positive recall.
c. Initiate corrective action with subcontractors when non-conforming items are received, as required by the nature and frequency of non-conformance. All measuring and testing equipment and devices used to verify characteristics that can affect item quality shall be controlled and maintained. At prescribed intervals, or prior to use, they shall be calibrated and adjusted against certified equipment having a known valid relationship to nationally recognized standards. Where no national standards exist, the basis employed for calibration shall be documented. No special calibration and control measures are necessary on rulers, tape measures, levels and other such devices; if normal commercial practices provide for adequate accuracy and / or if large tolerances are allowed for the corresponding measurements.

8. The contractor shall

8.1 Include in calibration procedures, equipment type, frequency of checks, and description of check method, acceptance criteria and action to be taken when results are unsatisfactory. Exception will be allowed for measuring and testing equipment for which calibration is simple and does not require a specific detailed procedure. The contractor shall identify those types of measuring equipment for which he has not provided calibration procedures.

8.2 Identify measuring and testing equipment with a tag, sticker, or other suitable indicator to show the calibration status.

8.3 Maintain calibration records for measuring and testing equipment.

8.4 Assess and document the validity of previous inspection and test results when measuring and testing equipment are found to be out of calibration. For concreting and earthwork activities.

8.5 The Above mentioned requirements are mandatorily applicable only to the following equipment and instruments.

- **a.** Laboratory scale
- **b.** Compression test machine
- **c.** Tensile test machine
- **d.** Batching plant
- **e.** Grout batching machine
- **f.** Concrete batching plant
- **g.** Soil-cement batching plant
- **h.** Gauge for mechanical splicing for all other equipment and instruments, the requirements are non-mandatory but they may be used as a guide.

9. INSPECTIONS AND TEST - The Contractor shall provide for the performance of inspections and tests as specified in the quality plan. These inspections and tests shall be carried out in accordance with written procedures that define the acceptance / rejection criteria. The contractor shall amend the selected inspection methods in cases where their unsuitability is demonstrated. Inspections and tests shall be documented in inspection and test reports that identify as a minimum the item inspected or tested, applicable drawings, specifications or procedures, the date of inspection or test, the inspector, tester or data recorder, the type of observation, the results, the acceptability and the action taken in connection with any deficiencies identified.

10. IN-PROCESS INSPECTION - The contractor shall

- **A.** Identify, inspect and / or test items as required by the quality plan.
- **B.** Monitor process methods, where inspection is not feasible.
- **C.** Hold items until the required inspections and / or test have been completed or necessary reports have been received and verified except when items are released under positive recall.
- **D. FOR CONCRETING ACTIVITIES –**
- **a.** The Contractor shall establish adequate measures for pre-concreting, in process and post-concreting inspections to be performed as applicable.
- **b.** A part of these inspections and the documentation thereof may be delegated to the works personnel. In such cases, the independent inspections can be reduced to an extent to be defined in the quality plan or in the inspection procedures only the approval of Engineer-In-Charge.

c. Such Measures do not preclude complete independent inspections to be performed on a programmed basis or as consequence of results obtained.

11. FINAL INSPECTION - The contractor shall

Identify, inspect and / or test the completed item as required by the quality plan. And Verify that the item has been inspected at all points shown in the quality plan and that the records are adequate and completed.

12. INSPECTION STATUS - The contractor shall

12.1 Provide means for assuring that required inspections and tests are performed and that the acceptability of items with regard to inspections and tests performed is known throughout manufacturing and construction.

12.2 Establish and maintain a system for identifying the inspection / acceptance status by means of tags, stamped impressions, or other physical means to be affixed to the item or its container or by means of inspection records.

12.3 Show the Identity of the contractor and his inspector on any inspection marking used.

12.4 Provide for measures for controlling status indicators including the authority for application and removal of tags, stamps or other marking.

12.5 Identify non-conforming items until their conformity is established.

13. IDENTIFICATION AND TRACEABILITY - The contractor shall establish and maintain an adequate system to

13.1 Identify Each Item (lot, component or part) to the applicable drawing, specification or other technical document, throughout the whole construction process.

13.2 Assign to each item a unique identification where specific traceability is required by the contract.

13.3 Record this identification on all process, inspection and test records, where traceability is specified.

13.4 List the items that do or do not require traceability concerning concrete activities.

14. PRESERVATION HANDLING AND STORAGE - The contractor shall

14.1 Establish, maintain and document a system for the preservation, storage and handling of all items from the time of receipt through the entire construction process and subsequent storage to prevent abuse, misuse, damage deterioration or loss.

14.2 Periodically inspect stored items for condition and shelf – life expiry.

14.3 Inspect and test special handling tools and equipment at specific times to verify that the tools and equipment are adequately maintained and will not damage the items and will ensure safe and adequate handling.

14.4 Use specific written procedure and trained personnel for lifting of critical or high value items.

15. CONSTRUCTION - The Contractor shall clearly define the responsibilities for the documented preparation of works. This written preparation shall consist of instructions or work assignments. It shall be established in accordance with the construction schedule sand be available to the works and inspection personnel prior to commencement of work. This work instruction will document the following.

a. Work methods
b. Sequence of operations
c. Workmanship criteria
d. Type of equipment needed
e. Special working environment, if any. For concreting and other common civil work activities, these instructions may be included in drawings, specifications or other design documents.

The contractor shall ensure that prior to release for construction all jigs, fixtures, tooling masters, templates, and patterns used for verifying quality are controlled. The extent and frequency of tool control shall be defined.

16. SPECIAL PROCESSES - The Contractor shall

16.1 Identify those special processes subject to the requirements of this clause. Special processes shall include welding, heat-treating and non-destructive examination, as applicable.

16.2 Establish documented procedures to assure that these processes are accomplished under controlled conditions by qualified personnel using qualified documented procedures and suitable equipment in accordance with applicable codes, standards, specifications, criteria and contractual requirements.

16.3 Maintain documentation for currently qualified personnel and processes according to the requirement of pertinent codes and standards

16.4 Define the necessary qualifications of personnel and procedures for special processes not covered by existing codes or standards, or where item or service quality requirements exceed the requirements of established codes or standards.

16.5 Not Consider Concreting as a special process. However the contractor shall ensure that foremen and vibrator operators are properly selected from experienced or trained personnel prior to assignment of works and are given regular training by concrete placement experts as needed.

17. QUALITY RECORDS - The Contractor shall:

17.1 Maintain quality records as evidence that:

- **a.** The quality assurance program meets the requirements of this Quality Management Requirement (manual, procedures, quality plan).
- **b.** The items or services meet contractual or other applicable technical requirements) specifications, drawings, calculations, manufacturing, inspection and test procedures).
- **c.** Personnel and procedures for special processes are qualified.
- **d.** Measuring and testing equipment is calibrated.
- **e.** The procurements meet the requirements.
- **f.** Corrective actions are being taken and are effective as required.
- **g.** Audits are performed as required.

17.2 Maintain Final performance quality records which include as appropriate:

- **a.** As built records
- **b.** Material test reports or certificates.
- **c.** Non-destructive examination records or certificates.
- **d.** Inspection and test records
- **e.** Non-conformance reports
- **f.** Concrete batch plant printout.

17.3 Identify, index and file quality records for easy retrieval.

17.4 Retain quality records for the time specified in the contract. If not specified, final performance quality records shall be retained for 10 years.

17.5 Provide a suitable environment for storing of records to minimize deterioration or damage and to prevent loss (the use of a double filing system is an acceptable methods).

17.6 Construction completion certification is an important part of this contract package. In order to give full meaning to this requirement all quality records shall be generated, got authorized by all agencies at appropriate stages, documented and preserved. Periodic audits by competent authority shall be performed on these documents to establish the efficiency. These audits reports are to be submitted to the Engineer-In-Charge to provide an effective feedback so that corrective action can be initiated on time.

17.7 Construction completion document has to be prepared incorporating all the essential requirements and records, giving justification that all the requirements of drawings, specification are met and the design intent is met and this document shall be made available to the Engineer-in-charge at the time of completion.

18.0 NON-CONFORMANCE - The Contractor is responsible for the identification and disposition of all nonconforming items, including those of subcontractors. Final acceptance of the contractor's disposition of those items that violate contractual requirements is the prerogative of the Engineer-in-charge. The contractor shall Establish and maintain measures for controlling non-conforming items that,

- **a.** Define the responsibility and authority of those who dispose of nonconforming items. This clause include provision for a technical review that involves those who are responsible for design, manufacturing, construction and quality functions, if these functions are concerned.
- **b.** Detect and record non-conformances promptly unless these are corrected immediately in accordance with common construction practices.
- **c.** Identify and hold non-conforming items for evaluation, these need not be held if subsequent work is not affected.
- **d.** Develop a disposition that has the concurrence of all responsible parties.
- **e.** Implement accepted dispositions. This clause includes requirements for re-inspecting and re-testing repaired and reworked items.
- **f.** Verify the implementation of accepted dispositions.
- **g.** Provide holding areas or methods for segregating non-conforming items to prevent unauthorized use, shipment or mixing with conforming items. However, where physical segregation is not practical or the nonconformance is not clearly visible, tagging, marking or other positive means of identification is acceptable.
- **h.** Maintain records that identify non-conforming items, the nature and extent of non-conformance, its disposition and objective evidence that repaired and reworked items have been re-inspected or re-tested according to applicable procedures.

19.0 NRB SUPPLIED ITEMS - The NRB is responsible for specifying in the contract the Quality Management Requirements applicable for items supplied by himself to the contractor and for certifying that these items are consistent with the quality requirement of the final items. The Contractor Shall

- **a.** Verify NRB verification.
- **b.** Examine NRB supplied items on receipt for completeness and proper type and to detect transit damage. Further receiving inspection is not required unless the contractor needs actual characteristics for subsequent work or unless specified in the contract. Examination may be deferred until further processing is scheduled if items are in sealed containers or

have special preservation or packaging.

c. Control NRB supplied items from receipt onwards according to the requirements of this standard.

d. Report promptly in writing to the quality assurance representative, any NRB supplied items found damaged, lost, non-conforming, or otherwise unsuitable or unnecessary for use either on receipt or while in the contractor's custody.

20. CORRECTIVE ACTION - The contractor shall: Investigate the causes of significant or recurring non-conformances and take appropriate action to prevent repetition. Document and have reported to appropriate levels of the contractor's management causes of significant conditions that adversely affect quality and the corrective action taken.

21. QA PROGRAMME, FACILITIES AND PHYSICAL RESOURCES. - Prior to the award of a contract, and to the performance of the activity, the Engineer-in-charge shall evaluate the contractor's quality assurance program, manufacturing facilities and resources to determine whether the requirements of this section can be met. In the event of the contractor not fulfilling all applicable requirements, NRB may award the contract provided that he takes the responsibility for those QA requirements that will not be met by the contractor. In such a case, the exceptions shall be clearly defined in the contract.

22. QUALITY PLAN - NRB shall evaluate the quality plan and all revisions thereto in order to determine its acceptability. NRB shall indicate his witness points and hold points on the accepted quality plan. In addition, NRB shall perform surveillance according to the accepted quality plan.

23. ACCESS - The contractor shall provide for reasonable access of the competent authorities and of NRB to his premises and records for audit and surveillance purposes. Contractor shall be permitted to use the existing roads in the establishment area for the purpose of transporting labourers and materials etc. The Engineer-in-charge, however, will not undertake to provide any approach roads to the site of work. It shall be entirely the responsibility of the contractor to provide and maintain such temporary approach roads at his own cost for the purpose of movement of men, materials and equipment. Layout of such approach road shall be submitted to Engineer-in-charge for his approval before undertaking the construction of the same. Such approach roads shall be made available to other agencies carrying out the work in the same area in consultation with Engineer-in-charge of the works without any extra cost.

24. AUDIT - There shall be provision for having periodic internal audits conducted on the Quality Assurance System and the activities affecting quality of this package. These audits may be carried out once in six months by independent group of the contractor.

24.1 The Contractor shall agree to have periodic Audits conducted by NRB Internal Audit Group. The contractor shall be bound to provide corrective actions and responses when some non-conformances are reported at these audits.

24.2 The Contractor shall refer to the scope of supply of various materials and other services by the
Engineer-in-charge. The contractor is deemed to have taken due account of the same while arriving at the rates for supply of various items as per 'Schedule of Quantities and Rates'. Items of work which have not been covered anywhere but are needed for the correct and satisfactory execution of the work shall be carried out by the contractor to the entire satisfaction of the Engineer-In-Charge.

24.3 The rates for the items included in the 'Schedule of Quantities and Rates' are inclusive of all material, labour, plant and equipment, transport and storage of materials and equipment, necessary supervision by Contractor's /manufacturers authorized representatives, overheads, profits and all incidental expenditures(s) as may be required for the complete and satisfactory execution of the work covered under this contract.

25. ADDITIONAL REQUIREMENTS/INFORMATION

25.1 Total responsibility with regard to quality surveillance/quality control, inspection shall be with the Contractors.

25.2 NRB will be represented by a Quality Surveyor designated by the Engineer-in-charge. The Quality Surveyor and his designated staff will be responsible for checking the quality of work to the extent necessary as per relevant procedures and inspection plans to assess compliance with the provisions of the specifications. His surveillance shall not be limited only to examination of the end product but he shall have complete access to the work and the right to intervene where bad practice is detected. He shall also have the right to conduct or require the contractor to perform, any additional inspection or testing he deems necessary. Any unacceptable defects noted by such tests shall be rectified by the contractor without any extra cost to NRB. The surveillance provided by the Engineer-in-charge or the approval by the Quality Surveyor of finished work shall not relieve the contractor of any of his responsibilities under this specification. The rejection of any work not meeting these specifications is possible at any time. The contractor shall maintain quality control records, which shall have details of all the quality control operations that were performed. The quality surveyor shall have the right to witness any such operation and call for such record.

25.3 Right in the tendering stage itself, the contractor shall give an organization chart including number of persons to be deployed on the work, qualification along with their experience, justifying the adequacy to meet the construction schedule.

25.4 Minimum number of personnel to be deployed by the contractor, requisite educational qualification and experience shall be subjected to the verification of NRB.

25.5 The package contractor shall also provide an organization chart for quality control inspection etc. with proper interfacing with the contractor's executive groups and purchaser's executing and quality assurance groups and NRB.

25.6 NRB's responsibility to quality will be only in the form of QA function.

25.7 All efforts shall be made by the contractor to keep the laboratory facility available throughout the contract period.. In the event of testing machine being out of order, contractor shall arrange the testing of materials at his cost at any laboratory approved by NRB.

25.8 List of pre-qualified/approved test houses, organizations will be given by NRB. If contractor proposes any other standard/certified laboratory, such laboratories will be evaluated for their adequacy in fulfilling the requirements. On fulfilling the requirements, NRB will approve such laboratories for further testing. Cost of evaluation shall be borne by the contractor.

25.9 For site inspection activities, a sample quality assurance plan will be provided to the contractor. He has to make his own detailed plans containing witness and hold points, and get it concurred/accepted by the concerned Purchase Engineer-in-charge.

25.10 Contractor shall submit the approved construction methodology (in parts) and required procedures well in advance of commencement of work. At first instance, it shall be treated as a part of mobilization. These documents shall be revised whenever need arises.

25.11 To achieve speedy implementation of commissioning in the schedule time, the contractor shall be responsible for completion relevant systems to the fullest extent before taking up pre-commissioning.

25.12 Contractor shall have a clear cut documentation policy which shall include generation of reports, completeness at appropriate time and careful storage of records.

25.13 Contractor shall propose procedures for pre-qualification, procurement/ storage/testing and handling of the materials required for the present package at the time of tendering.

25.14 The contractor shall have in-built facilities for internal audit of all the reports/documents at least once in six months to see that his quality Assurance system is working, the works are proceeding in proper direction and non-conformances are being identified and corrective actions are in vogue. In addition to the above, there shall be internal audit by site QA, Contractor shall be responsible for audit, feedback, initiating DCR's implementation status, traceability of records.

25.15 The contractor shall prepare and submit the construction completion certificate (CCC) as per the sample format approved by NRB. The Documents required to be enclosed in the CCC will have to be maintained by the contractor, in their record room in an easily accessible form right from the start of construction to completion.

26 GENERAL NOTES

27 Products with relevant I.S. markings from the I.S. Licensed manufacturers, who are in the market for the last three years with valid I.S. License, shall be considered for approval. Only "First" quality materials shall be used.

28 Specification of manufacturer's item shall be checked against tender item / specifications before selecting any product or brand name. In case of any discrepancy, tender item / specifications shall prevail and any such brand of item shall not be used which is not conforming to tender specifications even if it is listed in this list.

29 For use of material from a BIS listed / certified manufacturer, the contractor shall furnish a copy of the valid BIS certificate to the Employer before procuring the material.

30 Samples of all materials, fittings etc. to be incorporated in the work shall be submitted by the contractor and got it approved from the Engineer-in-Charge, before supply in bulk at site of work. Wherever particular make or its equivalent is mentioned in the item schedule, the decision of the Engineer-in-Charge in selection of particular make or its equivalent shall be final and binding on the contractor. The approved samples will be kept in custody of the Engineer-in-Charge till completion of the work. Materials not conforming strictly to the approved samples will be rejected

IV (4) - APPENDIX

APPENDIX – 'A'

FORM OF BANK GUARANTEE BOND FOR PERFORMANCE SECURITY /SECURITY DEPOSIT

1. 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") .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 for compliance of his obligations in accordance with the terms and conditions in the said agreement, we .....(Indicate the name of the Bank) (hereinafter referred to as "the Bank") hereby undertake to pay to the Government an amount not exceeding Rs. ..... (Rs.....only) on demand by the Government.

2. We ..... (indicate the name of Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demur, 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 claim against us for making such payment.

4. We..... (indicate the 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 the 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 ..... (indicate the 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 to 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,..... (Indicate the 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 the date of expiry or the extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Signed and sealed

Dated the ..... day of ..... for .....

(Indicate the name of Bank)

*****

APPENDIX - 'B'

PROFORMA FOR GUARANTEE TO BE EXECUTED BY THE CONTRACTORS FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF WATERPROOFING WORKS.

Name of work:

Work order No:

Agreement No:

This agreement made this _____day of_____ two thousand and _____between_____
(hereinafter called the Guarantor of the other part) and the PRESIDENT OF INDIA

(Hereinafter called the Government of the one part) WHEREAS THIS agreement is supplementary to a contract (hereinafter called the Contractor dated and made between the GUARANTOR OF THE ONE PART AND GOVERNMENT of the other part, whereby the Contractor, interalia, undertook to render the buildings and structures in the said contract recited completely water and leak proof. AND WHERE THE GUARANTOR agreed to give a guarantee to the effect that the saids structures will remain water and leak proof for_____years from the date of _____. NOW THE GUARANTOR hereby guarantees that waterproofing treatment given by him will render the structures completely leak proof and the minimum life of such waterproofing treatment shall be 10 years to be reckoned from the date after the maintenance period prescribed in the contract. Provided that the guarantor will not be responsible for leakage caused by earthquake or structural defects or misuse / alteration of structures and for such purpose:

(a) Misuse shall mean operation which will damage treatment, like chopping of firewood and things of the same nature which might cause damage.

(b) Alteration shall mean construction of an additional structure or a part or construction adjoining to existing structure whereby treatment is removed in parts.

(c) The decision of the Project Director with regard to cause of leakage shall be final. During this period of guarantee the guarantor shall make good all defects and in case of any defect being found render the building waterproof to the satisfaction of the Engineer-in-Charge at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from the Engineer-in-Charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the guarantor's cost & risk. The decision of the

Engineer-in-Charge as to the cost payable by the Guarantor shall be final and binding. That if the Guarantor fails to execute the waterproofing or commits breach there under then the Guarantor will indemnify the Principal and his successors against all loss damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the Guarantor in performance and observance of this supplemented agreement. As to the amount of loss and/or damage and cost incurred by the Government the decision of Engineer-in-Charge will be final & binding on the parties.

IN WITNESS WHEREOF these presents have been executed by the Obligator (Guarantor) _____and _____ for and on behalf of the President of India on the day, month and year first above written.

SIGNED SEALED AND DELIVERED BY (Obligator / Guarantor) in the presence of:

1.

2.

Signed for and on behalf of the President of India in the presence of

1.

2.

APPENDIX - 'C'

INDENTURE FOR SECURED ADVANCE

(For use in cases in which the contract is for finished work and the contractor has entered into an agreement for the execution of certain specified quantity of work in a given time.)

Government of India

BHABHA ATOMIC REASERCH CENTRE

State: Maharashtra

Administration: Department of Atomic Energy

Division: NUCLEAR RECYCLE BOARD

THIS INDENTURE made the.....day of .....19..... BETWEEN ..... (hereinafter called the Contractor which expression shall where the context so admits or implies be deemed to include his executors, administrators and assigns) of the one part and the President (hereinafter called the President which expression shall where the context so admits or implies be deemed to include his successors in office and assigns) of the other part.

WHEREAS by an agreement dated ..... (Hereinafter called the said agreement) the contractor has agreed.

AND WHEREAS the contractor has applied to the President that he may be allowed advance on the security of materials absolutely belonging to him and brought by him to the site of the works, he subject of the said agreement for use in the construction of such of the works as he has undertaken to execute at rates fixed for the finished work (inclusive of the cost of materials and labour and other charges).

AND WHEREAS the President has agreed to advance to the contractor the sum of Rs ....on the security of materials, the quantities and other particulars of which are detailed in Part-II of a Running Account Bill (B) for the said works signed by the contractor on ..... and the President has reserved to himself the option of making any further advances on the security of other materials brought by the contractor to the site of the said works.

NOW THIS INDENTURE WITNESSETH that in pursuance of the said agreement and in consideration of the sum of Rs. ..... on or before the execution of these presents paid to the contractor by the President (the receipt where of the contractor both hereby acknowledge and of such further advance, if any, as may be made to him as aforesaid the contractor both hereby convenent and agree with the President and declare as follows:

1. That the said sum of Rupees .....so advanced by the President to the contractor as aforesaid and all or any further sum or sums advanced as aforesaid shall be employed by the contractor in or towards expenditure the execution of the said works and for no other purpose whatsoever

2. That the materials detailed in the said Running Account Bill (B) which have been offered to and accepted by the President as security are absolutely the contractor's own property and free from encumbrances of any kind and the contractor will not make any application for or receives a further advance on the security of materials which are not absolutely his own property and free from encumbrance of any kind and the contractor indemnifies and president against all claims to any materials in respect of which an advance has been made to him as aforesaid.

3. That the materials detailed in the said Running Account Bill (B) and all other materials on the security of which any further advance or advances may hereafter to be made as aforesaid (hereinafter called the said materials) shall be used by the contractor solely in the execution of the said works in accordance with the directions of the Divisional Officer of the said works, Civil Engineering Division (hereinafter called "the Divisional Officer) and in the terms of the said agreement.

4. That the contractor shall make at his own cost all necessary and adequate arrangements for the proper watch, safe-custody and protections against all risks of the said materials and that until used in construction as aforesaid said materials shall remain at the site of the said works in the contractor's custody and on his own responsibility and shall at all times be open to inspection by the Divisional Officer or any officer authorised by him. In the event of the materials or any part thereof being stolen, destroyed or damaged or becoming deteriorated in a greater degree that is due

to reasonable use and wear thereof the contractor will forthwith replace the same with other materials of like quality or repair and make good the same as required by the Divisional Officer.

5. That the said materials shall not on any account be removed from the site of the works except with the written permission of the Divisional Officer or an officer authorised by him on that behalf.
6. That the advance shall be repayable in full when or before contractor receives payment from the President of the price payable to him for the said works under the terms and provisions of the said agreement. Provided that if any intermediate payments are made to the contractor on account of work done there on the occasion of each such payment the President will be at liberty to make a recovery from the contractor's bill for such payment by deduction there from the value of the said materials than actually used in the construction and in respect of which recovery has not been made previously the value for this purpose being determined in respect of the each description of materials at the rates at which the amounts of the advances made under these presents were calculated.

7. That if the contractor shall at any time make any default in the performance or observance in any respect of any of the terms and provisions of the said agreement or of these presents the total amount of the advance or advances what may still be owing to the President shall immediately on the happening of such default be repayable by the contractor to the President together with interest thereon at twelve percent per annum from the date of respective dates of such advance or advances to the date of repayment and with all costs, charges, damages and expenses incurred by the President in or for the recovery thereof or the enforcement of this security or otherwise by reasons of the default of the contractor and contractor hereby covenants and agrees with the President to repay and pay the same respectively, to him accordingly.

8. That the contractor hereby charges all the said materials with the repayment to the President of India they said sum of Rs. and any further sum or sums advanced as aforesaid and all costs, charges, damages and expenses payable under these presents PROVIDED ALWAYS and it is hereby agreed and declared that not-withstanding anything in the said agreement and without prejudice to the powers contained therein if and whenever the convenant for Payment and repayment herein before contained shall become enforceable and the money owing shall not be paid in accordance there with the President may at any time thereafter adopt all or any of the following courses as he may deemed best.

a) Seize and utilise the said materials or any part thereof in the completion of the said works on behalf of the contractor in accordance with the provisions in that behalf contained in the said agreement debiting the contractor with the actual cost of effecting such completion and the amount due in respect of advances under these present and crediting the contractor with the value of work done as if he had carried it out in accordance with the 42 said agreement and at the rates thereby provided. If the balance is against the contractor he is to pay same to the President on demand.

b) Remove and sell by public auction the seized materials or any part thereof and out of the moneys arising from the sale retain all the sum, aforesaid repayable or payable to the President under these presents and pay over the surplus (if any) to the contractor.

c) Deduct all or any part of the money owing out of the security deposit or any sum due to the contractor under the said agreement.

9. That except in the event of such default on the part of the contractor as aforesaid interest on the said advances shall not be payable.

10. That in the event of any conflict between the provisions of these presents and the said agreement the provisions of these presents shall prevail and the event of any dispute or difference arising over the construction or effect of these presents the settlement of which has not been herein before expressly provided for the same shall be referred to the Director, GSO, NRB, BARC, Tarapur time being in force shall apply to any such reference.

IN WITNESS thereof the said ..... and..... by the order under the direction of the President have hereinto set their respective hands the day and year first above written. Signed, sealed and delivered by the said contractor in the presence of:

Signature

Name

Address

Witness

Signed by the order and direction of the President in the presence of:

Signature

Name

Witness Address

* * * * * * * * * * * * * *

APPENDIX - 'D'

GUARANTEE BOND FOR ANTITERMITE TREATMENT

(For Guarantee to be executed by contractors for removal of defects after completion of antitermite treatment works)

This agreement made this.....day of ..... two thousand .....between M/s..... (Hereinafter called "the Guarantor of the one part) and the PRESIDENT OF INDIA (hereinafter called "the Government" of the other part.) Whereas this agreement is supplementary to a contract (hereinafter called "the Contract) dated.....and made between the Guarantor of the one part and the Government of the other part whereby the Contractor inter-alia undertook to render the buildings and structure completely termite proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said structure will remain termite proof for ten years from the date of handing over of the building and or completion date of contract whichever is later.

NOW THE GUARANTOR hereby guarantees that the anti-termite treatment provided by him will render the structures completely termite proof and the minimum life of such antitermite treatment shall be ten years to be reckoned from the date of handing over of the building and/or completion of the building whichever is later. Provided that the Guarantor will not responsible for damages caused due to structural defects or misuse of premises/area.

a) Misuse of premises shall mean any operation which will disturb the chemical barrier like excavation under floors, breaking of walls at G.L. disturbing the treatment already carried out. The decision of the Engineer-in-Charge with regard to cause of damage shall be final. During this period of guarantee the guarantor shall make all the arrangements to do the post constructional anti-termite treatment in all the buildings in case of any termite nuisance being found in the building, to the satisfaction of the Engineer-in-Charge at the cost of guarantor and shall commence the work for such treatment within seven days from the date of calling upon him to rectify the defects, by the Engineer-in-Charge, failing which the work shall be got done by the Department by some other contractor at the GUARANTOR'S COST and risk.

The decision of the Engineer-in-Charge as to the cost payable by the Guarantor shall be final and binding. That if the Guarantor fails to execute the anti-termite treatment or commits breach there under then the Guarantor will indemnify the principal and his successors against all loss, damage, cost, expense or otherwise which may be incurred by the Department by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and/or cost incurred by the Government the decision of the Engineer-in-Charge will be final and binding on the parties.

IN WITNESS WHEREOF these presents have been executed by the Obligator.....and by.....and for and on behalf of the PRESIDENT OF INDIA on the .....day,..... month and year first above written.

SIGNED, sealed and delivered by (OBLIGATOR) in the presence of:

1.

2.

SIGNED FOR AND ON BEHALF OF THE PRESIDENT OF INDIA BY.

..... in the presence of:

1.

2.

APPENDIX - 'C'

(On Rs 100/ Stamp Paper)

CONFIDENTIALITY & NON-DISCLOSURE AGREEMENT

This Agreement is entered into on this day _____ (date month and year) _____ by & between President of India acting through GM, INRPO, BARC Tarapur, Department of Atomic Energy, Government of India, located at Tarapur-401 502 (herein called GM) and M/s _____ (full name and address of the company/ supplier) _____ (herein after called _____) maintaining confidentiality in respect of _____ (particular in brief of the deal with the company / supplier, giving in brief details of know-how, if any, developed by either parties or jointly) _____ . The agreement will coexist with the main agreement remain in force, which ever expires earlier. Now, therefore, for and in consideration of mutual covenants and promises contained herein the parties to the Agreement hereby agree as follows:

1. 'Confidential' information shall include all information which are by their nature confidential, disclosed in confidence by one party to the other party directly or indirectly, in written or any other tangible form, before or during the term of this agreement. By way of illustration, it would include supply of information relating to other party's research, development, engineering data, specifications, process, formulations, production operation and / or techniques, software and other information of similar nature, in connection with the business. For the purpose of this agreement 'Confidential information' shall not include:

a) Information which is in the public domain at the time of disclosure.

b) Information which although originally confidential information's, becomes available broadly to the public through no fault of the party hereto under separate agreement or applicable law.

c) Information independently developed by or known to the employees or agent of the party hereto, provided such party can show that the employees concerned have had no access to confidential information hereunder.

d) Information which comes to a party on a non-confidential basis from a source other than a party hereto, its employees or agents provided that such source is not bound by the confidentiality agreement with or other obligations of confidentiality or secrecy to the other party hereto under a separate agreement or applicable law.

2. Confidential information received by any party pursuant to this agreement shall not disclosed to any other third party person(s) (except to the employees or agents of the receiving party having a need to know), without the express written consent of the disclosing party. The receiving party shall ensure that each employee or agent having access to confidential information will be made aware of the agreement and will be made to comply therewith.

3. The receiving party shall use the confidential information permitted under other written agreements between the parties and shall not use or exploit such information for its own benefit or for the benefit of others without the prior written consent of the disclosing party.

4. The contractor shall protect any such confidential information disclosed pursuant to this agreement with at least the same degree of care that it regularly employs to safeguard its own priority and confidential information from unauthorized use or disclosure.

APPENDIX -F

Form of Earnest Money Deposit
Bank Guarantee Bond

WHEREAS, contractor..... (Name of contractor) (Hereinafter called "the contractor") has submitted his tender dated..... (Date) for the construction of..... (Name of work) (Hereinafter called “the Tender")

KNOW ALL PEOPLE by these presents that we..... (Name of bank) having our registered office at..... (Hereinafter called "the Bank") are bound unto..... (Name and division of Tender Inviting Authority) (Hereinafter called "the Engineer-in-Charge") in the sum of Rs..... (Rs. in words .....) for which payment well and truly to be made to the said Engineer-in-Charge the Bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this..... Day of..... 20..... .
THE CONDITIONS of this obligation are:

(1) If after tender opening the Contractor withdraws, his tender during the period of validity of tender (including extended validity of tender) specified in the Form of Tender;

(2) If the contractor having been notified of the acceptance of his tender by the Engineer-in-Charge:

(a) Fails or refuses to execute the Form of Agreement in accordance with the Instructions to Contractor, if required;

OR

(b) Fails or refuses to furnish the Performance Guarantee, in accordance with the provisions of tender document and Instructions to contractor,

OR

(c) Fails or refuses to start the work, in accordance with the provisions of the contract and Instructions to contractor,

OR

(d) Fails or refuses to submit fresh Bank Guarantee of an equal amount of this Bank Guarantee, against Security Deposit after award of contract.

We undertake to pay to the Engineer-in-Charge either up to the above amount or part thereof upon receipt of his first written demand, without the Engineer-in-Charge having to substantiates his demand, provided that in his demand the Engineer-in-Charge will note that the amount claimed by his is due to him owing to the occurrence of one or any of the above conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date* ..... after the deadline for submission of tender as such deadline is stated in the Instructions to contractor or as it may be extended by the Engineer-in-Charge, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE ..... SIGNATURE
OF THE BANK

WITNESS .....
SEAL

(SIGNATURE, NAME AND ADDRESS)

*Date to be worked out on the basis of validity period of 6 months from last date of receipt of tender.

(SECTION–V)

Technical Specifications & Scope of Work

“The approved/suggested makes have been specified in the tender document based on requirements of NRB, desired performance, detailed study of the technical parameters, manufacturing process, quality assurance/control & testing. The list is merely for guidance purpose. However, the bidder(s) can supply any equivalent make(s) which is/are meeting technical specifications given under Section-V, the Schedule of Quantities (Schedule 'A') given under Section-VI of Tender Documents and confirming to the technical parameters, performance of the approved/suggested makes. However if suppliers prefer to supply such equivalent make, prior approval of Engineer In Charge is required”.

Name of Work: Detailed Engineering, Fabrication, supply, Installation & Commissioning of control & Instrumentation system, Data Acquisition & control system, CCTV Surveillance System, Access Control system UPS power supply system & fire alarm monitoring system, for WPF plant at BARC/NRB Tarapur .

SCOPE OF WORK

1.0 Scope: Scope of work includes Detailed Engineering, Fabrication, supply, Installation & Commissioning of control & Instrumentation system, Data Acquisition & control system, CCTV Surveillance System, Access Control system UPS power supply system & fire alarm monitoring system.

This tender is intended to cover the works of Fabrication & supply of different types of field instruments, SS tubes, Valves & tube fittings Installation & commissioning of C&I (Control & Instrumentation System, fabrication of PLC panel, SCADA Operating Panel, Supply, installation & commissioning of SCADA and PLC system, Networking system with all required hardware & accessories, interfacing of Field instruments with PLC & ScADA system as per system architecture requirements, interfacing of PLC,SCADA system with Local PLCs of different individual standalone systems, Testing of PLC & SCADA system with field instruments, Supply, Installation & commissioning of CCTv based Surveillance system with required Networking equipment, Mounting structure/Hardware/Fixtures, Fire alarm Monitoring system, UPS power system and Access control system.

The whole work scope of fabrication, Supply, Installation & commissioning & testing for different system as illustrated further in detail in this document.

The details of work of scope for C&I system, Data acquisition & control system, CCTv surveillance system, fire alarm system, UPS power system and Access control system as mentioned below in this document.

2.0 Scope of work for C&I system: The C&I system of WPF is comprise of Field Instrumentation work of Process Measurement & control of different plant process systems.
Scope of work includes, fabrication, supply, installation, commissioning and testing of different type of field instruments, Control system equipments likes valves, mass flow controller, SS tubes, tube fittings, instrumentation & network cables, etc. Details of all supply items/instruments/equipment mentioned in BOQ-C&I of particular system, Refer Part B & C for detailed scope of work and supply item specifications, respectively.

i) Preparation of C&I System Layout drawings for Installation & commissioning, GA drawings of PLC Panel, Layout drawings for Cable tray erection & cable laying, Field Jbs, and filed wiring termination, etc.

j) Procurement of all materials mentioned in BOQ, assembly, shop testing, delivery at site, erection, installation along with all required accessories and Hardware.

k) The scope also include supply & laying of Instrumentation tubes, Installation of SS tubes fittings, valves, Installation of field instrument as per Process requirement (Approx. quantity of No of field instruments, devices, valves, required installation & commissioning are mentioned in BOQ of particular system), Installation of single & Multi-pair Instrumentation cable, Installation & Commissioning of PLC and SCADA system, Field wire termination & interfacing of field instrument with PLC system as per BOQ-C&I.

l) All equipments, accessories, hardware, support structures, structural material required for the installation & commissioning, Cable laying, & tubing, erection of Cable Tray for the work of Control & Instrumentation system, shall be supplied and erected under this specification, as detailed in technical specification. All the work and supply items shall be strictly in accordance with the specifications & data sheets. Any item which may not have been specifically mentioned herein, but are required to complete the Installation & commissioning, testing of equipment / system shall also be treated as included and the same shall also be Supplied, furnished and erected, unless otherwise specifically excluded.

3.0 Scope of work for Data Acquisition & control system Control (DACS) of Instrumentation system (C&I System): The Scope of work includes, Supply of PLC based Control system with all required Hardware, accessories, SCADA system with license for remote monitoring & control, SCADA Server PCs, SCADA Operating control station (OCS, SCADA client Pcs), fabrication & supply of PLC panel, OCS panel for Operating client station, Network switches Installation Racks, Supply of Network switches, Network Cables, Fiber Optic cables, Patch cord as per Tender specification & requirements, and other Networking Hardware & accessories required for complete installation & commissioning (Refer BOQ-DACS for item List), Installation, Commissioning & testing of PLC, SCADA system, Cat6 & fiber optic cable laying work, field equipment interfacing with PLC system, system configuration, testing, Pre-Dispatch inspection of all supply items as per test requirements mentioned in individual item's technical specification, etc. **Refer Section-C** for technical specification of all supply items of DACS system and detailed scope of work

4.0 **Scope of Work for CCTV based Surveillance System:** The scope of work includes, Procurement, supply, installation & commissioning of CCTV cameras, Network switches, Network recorder with storage card/Hardware, Led TVs, required cabling works, fabrication, supply & installation of Mounting Racks and required fixture/Support structures for cameras, NVR, Preparation of plant layout for Installation of CCTV cameras, Network switches, NVR, etc. Configuration & testing of CCTv Network, All Supply items are mentioned in BOQ-CCTV.
Refer Part- C for technical specification of all supply items of CCTv system and detailed scope of work.

5.0 Scope of Work for UPS power supply System: : Supply, Installation, Commissioning, testing & cabling of UPS system. Uninterruptible Power Supply (UPS) of suitable rating(10 KVA) with Batteries (12 Volts) as per tender technical specification to provide power back up for all required voltage level of 24VDC & 230VAC used in Control & Instrumentation System. Supply, Installation, Commissioning, For Detailed Technical specification for supply items and For erection, Installation & Commissioning Refer Part- B and Refer Part –C for technical specifications..

6.0 Fire Detection & Alarm system: The scope of work comprises of the material procurement, preparation of drawings, assemblies, shop inspection, installation, Commissioning and testing of Fire Detection & Alarm system. Fire Detection & Alarm system installation commissioning work comprises of Installation, commissioning of Fire control panel, installation & Commissioning of Addressable, Multi-Sensor smoke and fire detectors, Beam detector for sensing of fire & smoke, Linear heat sensing cables for detection of fire in cable trays and Ventilation ducting, Installation & commissioning of Manual call points, repeater panel and interfacing of all fire sensor, detectors with a Fire control panel. Integration cum interfacing of Fire alarm system with existing centralized Fire Control panel is also the scope of work. All the accessories, Hardware required for Installation & Commissioning of system shall also be included in the bought out items list and same need to be supplied. Detailed Scope of work for supply items and For erection, Installation & Commissioning work, Technical specifications refer "Part B & C, respectively.

7.0 Access Control system: The scope of work comprises of the material procurement, preparation of drawings, assemblies, shop inspection, installation, Commissioning and testing of RFID Card based Access control system. The work comprises of fabrication, supply, of Double lane full height turnstile gates, Material entry gate, masking grills, RFID card readers, required Power supply, Networking cables & accessories, Installation & commissioning of whole Access Control system. Detailed Scope of work for supply items and for erection, Installation & Commissioning work, Technical specifications refer "Part B & C, respectively.

PART-B

TECHNICAL SPECIFICATIONS & Detailed Scope of Work

PART- B - Technical specification (for equipment supply)

Part B- 1A	Detailed Engineering work, Fabrication, supply, Installation, commissioning & testing of Different types of Field Instruments, Cables, cables trays, SS tubes, fittings & valves for C&I system with required accessories, Hardware, mounting structures, etc

B.1A.1 : SCOPE of Supply of Materials for C&I system :- Fabrication ,Supply, Inspection Factory testing of different kind of Field instruments like DP transmitters, Pressure Transducers, Radar Level transmitters, Thermocouples with compensating cables, Temperature transmitters (Universal I/P), Mass flow controller(Air), Mass Flow Metres(Air), Ultrasonic Flow Metres(Liquid), Purge Rotameters with DP regulators, Metal tube rotameters, PRV (Air), SS tubes (1/4 " & 10 mm OD), Double compression SS tube fittings(different kind as per tech specification), Ball valves, Niddle Valves, Load cell with Load cell display & transmitter unit, single & multi-pairs Instrumentation cables, Field Junction Boxes (JB with TBs, Din rail channel, etc), 3/2 way SVs, etc. refer Detailed BOQ-CI for different types of items & respective item's quantity and technical specification of Individual items for fabrication , selection of Supply Items.

B.1A.2 :Scope of Installation/erection, Commissioning & testing for C&I system:-

The scope of Installation, commissioning and testing of C&I system comprises of following scope of works, mentioned below

a. Installation, commissioning and testing of Different types of Process Measuring Instruments Mentioned in BOQ_C&I (Section –C)*.

b. Installation, commissioning and testing of Thermocouple, temperature transmitters as per process requirements*

c. Installation, commissioning and testing work of SS tubing, fittings & valves as per Process requirements*. SS tubing for Process Measurements system, Process control system like Pneumatic air supply tubing to Actuators/Dampers, Dampers controlling elements like SVs, all are in supplier 'scope of work

d. Field Instrumentation Cable laying, Termination of Field cables, interfacing of required field Instruments/devices/ equipment with PLC system as per Process Requirements*.

e. erection of Cable Trays with support structures as per requirements*.

f. Installation of Field Junction boxes for field cable termination*

g. Laying of cables in cable tray and on floor/wall with saddling as per cabling requirements*

h. Termination of field Instrumentation cables from Field instrument/ Field device/Equipment to Junction boxes, Termination in junction boxes with required accessories of termination, cable glands (SS make cable glands as per cable dimension requirements), laying of cable from JBs to PLC/ Marshalling Panel as per control wiring scheme and termination of cable in Panels.

i. Preparation of control wiring diagrams and cable layout, cable termination details, all are in supplier's scope. The purchaser will provide the sample wiring drawing for control scheme. After approval from BARC engineer, supplier will execute the work of Cable laying, termination, etc.

j. Tagging (metal tagging) of all field Instruments, valves, SS tubing lines as per requirements**

k. Cross ferruling with preparation of Layout drawings for field Instruments/Device Interfacing & termination work.

l. Supply of all required accessories, Hardware required for successful installation, commissioning & testing work, is in supplier scope.

m. Calibration of all field equipments/Instruments and preparation of calibration test report prior installation & commissioning in supplier's scope.

n. Supplier/Bidder/OEM will ensure the functioning of field instrument/equipment/device as per technical specification of tender, prior to installation & commissioning.

o. Performance testing of all field instrument/equipment/device after installation & commissioning. After successful installation, commissioning & testing only, completion certificate for the aforesaid Work will be Provided.

Note*: Approximated Quantity with tolerance band of +/- 10 % for Nos. of equipment/instruments/devices/valves, etc to be installed, erection of cable & cable trays, no of Jbs, field cable termination (no of quantity) are mentioned in BOQ-C&I. If actual quantity/lengths /Nos of desired Installation/erection completed work measurement found beyond the approx. quantity and its tolerance band, the settlement of accounts will be done according to as per actual executed work..

Note **: shall be done as per actual installed/erected quantity.

Technical Qualification criteria for supplier/OEM/Bidder for C&I System .

1. Supplier has to offer all the items and their quantity as per BOQ_C&I. All supplied items & other required accessories shall be as per technical specification, mentioned in Section- C with detailed specification, Make, Model no, of offered items shall comply to technical specification. The approved/suggested Makes are mentioned merely for guidance purpose, kindly refer Section-V of GCC (General contract conditions) of tender document.

2. All the offered items of BOQ shall be from OEM / OEM Authorised Distributor.

3. OEM / OEM Authorised Distributor/Bidder has to Provide the test setup facility accredit with NABL to carry out required test on supply item at the time of Pre-Dispatch Inspection as per Tender Specification requirements.

4. Bidder has to submit details, make, model no. or data sheets of all offered items in technical Bid. Failure to do so, the technical Bid submitted by Bidder is liable for rejection without any further clarification.

5. Supplier has to submitted all the certificates, asked in item's Detailed Technical specification.

Part B- 1B	**Detailed Engineering work, Fabrication, supply, Installation, commissioning, Interfacing & testing, of Data Acquisition & control System (DACS), with required accessories, Hardware, mounting structures, etc**

B.1B: This specification establishes the technical requirements for Monitoring & Control of process parameters & Remote operation of field device using PLC & SCADA based Data Acquisition system. Detailed specification of PLC , SCADA, Network interfacing Hardware & other required accessories are mentioned in in BOQ- DACS, and tender specification in Part -C .

B.1B.1: Scope for Supply of Material for DACS system: Fabrication, Supply, & Testing of PLC system with required I/Os, spares, Programing software(Licensed), Fabrication of PLC Panel, fabrication of Panel for Installation of Server & Process Operation, SCADA system with Workstation Pc, License of SCADA(Development cum runtime Server Licence), spare PCs, Network switches, Cat6 cables, Fibre optic cables, LIU units, Patch cords, Network I/O boxes, 9U racks with Mounting accessories, Required Hardware & accessories as per Tender Specification Mentioned in annexure-DACS and in quantity as per BOQ-DACS. All other material those are not mentioned in BOQ, but required for completion of Installation, commissioning & testing, shall also be supplied by Supplier/Bidder. All the supply items will be tested and qualified by Purchaser, before installation in field. All the items Pre-installation calibration/Test report shall be produced by supplier/bidder in advance Prior to Installation.

Installation of Instruments/Device shall be carried out after Approval from Engineer in-charge/Authorised Person of BARC, trarpur.

B.1B.2: Scope for Installation, commissioning & testing of DACS system:

The scope of Installation, commissioning and testing of C&I system comprises of following scope of works, mentioned below

a. Preparation of GA drawings, I/O details, Field Instruments interfacing & termination details with Loop wiring diagrams, Networking Architecture Layout with Ip address and Routing of Networking cables diagrams and other relevant documents required prior to Installation & testing of DACS system, Network switches, etc.

b. Installation of PLC panel with required Hardware & accessories, Mounting of panel.

c. Termination of field cables in PLC panel with proper **SS conduit** and with proper dressing arrangements

d. Interfacing of Field cables in TBs with proper cross ferruling tags, proper laying of cable in panel using Cable channels,

e. Distribution of 230 VAC, 24DC as per requirement with proper power rating MCBs, Provision for redundant , 230 VAC, 24 VDC power supply and its isolation & distribution through MCBs, shall be Provided.

f. Distribution of I/Os in panel shall be segregated for all types of I/Os (AI, AO, DI, DO) with Proper tagging.

g. . Installation of 9U racks for Installation of Fiber Optic LIU units, Network switches as per Pre- Approved Configuration & Architecture Layout.

h. Installation of Network switch, LIU, Laying & termination of Fiber Optic cables shall be as per Pre- Approved Configuration & Architecture Layout.

i. Laying of Cat-6 Network cables in Tray or on wall with saddling as per requirements.

i.1. Laying of Cat 6 cables on wall in SS lined conduit with saddling. No need of Conduit for Laying of cable inside Cable Tray.

j. Termination of Network cables in I/O boxes, Interfacing of Cable with LAN network.

k. There shall be Provision for redundant cable Laying, & interfacing of SCADA server PCs & PLC system with Network Switches. (redundant Network Architecture design for PLC & SCADA System is not required).

l. Interfacing of PLC & SCADA system with Third Party Device Like PLC, HMI (Modbus TCP/IP, OPC protocol based) with successful testing shall be carried out by Supplier/ Bidder.

m. If Interfacing with Third party device, required with Hardwired Interlocks, control wiring work, same shall be carried out by supplier/bidder (cable laying & signal termination, required for the same already estimated in work of cable laying & termination in BOQ- C&I.).

n. Testing of PLC, SCADA & Network system as Per BARC, Tarapur Approved Procedure, shall be carried out in presence of System Engineer of Supplier/Bidders at site after successful Installation of system.

o. Supplier's scope of work also includes, Application Program development for PLC & HMI/SCADA, Soft Alarms configuration, Trends, Periodic report logging and printing sheets development, Facility for user names & passwords for access control of SCADA operations.

p. The work of Software application program developments includes:

P.1). PLC programming (ladder/FBD) as per operation and interlocking logic.

P.2). SCADA and HMI programming/ configuration as per client requirements

P.3). Development of Event Reports, Process Reports, Periodic Reports as Per Client requirements.

P.4) Supply of Third Party Reporting Tool/ Software application for development of Reports and its interfacing with SCADA system is in Supplier/Bidder 'Scope.

q. Field device Interfacing: field cable from installed field devices/equipment will be terminated

in PLC panel, wiring for interfacing of devices to PLC I/O modules ,All the field devices will be terminated in PLC Panel.

r. PLC communication cabling including between remote I/Os and PLC (data highway cables) and LAN cables shall be run through the HDPE pipe/ PVC conduit where ever required. Supply of HDPE pipe/PVC conduit is also in supplier's scope.

Technical Qualification criteria for supplier/system integrator of PLC and SCADA system:

1. Supplier has to offer all the items and their quantity as per BOQ_DACS. All supplied items & other required accessories shall be as per technical specification, mentioned in Section- C with detailed specification, Make, Model no, of offered items shall comply to technical specification. The approved/suggested Makes are mentioned merely for guidance purpose, kindly refer Section-V of GCC (General contract conditions) of tender document

2. Supplier of PLC and SCADA system shall be a OEM authorized Distributor/ system integrator/OEM. A certificate for the same shall be submitted by system integrator or bidder if required.

3 . Supplier/bidder has to ensure that Installation & Commissioning work of PLC and SCADA system shall be executed by OEM certified, system integrator only.

4. Bidder has to submit details, make, model no. or data sheets of all offered items in technical Bid. Failure to do so, the technical Bid submitted by Bidder is liable for rejection without any further clarification.

5. Factory acceptance Test & Site acceptance Test will be carried out at the time Pre-dispatch inspection & during commissioning stage of system, respectively. Supplier/Bidder has to Provide full support, tools, calibrators as per the client requirements for testing. All the instruments/calibrators, those will be used during testing shall be accurate, precise and properly calibrated. Supplier/bidder has to produce the calibration certificate (NABL Accredited) on demand of client at the time of testing.

Part B- 1C	**Detailed Engineering work, Fabrication, supply, Installation, commissioning & testing of Different types CCTv System, POE Network switches, 9U Racks, NVR, cat6 & Fiber Optic Cable laying & interfacing with LIU with required accessories, Hardware, mounting structures, Testing and documentation work etc.**

B.1C.1 : SCOPE of Supply of Materials for CCTv system: Fabrication, Supply, & Testing of CCTV cameras of different types, POE Network switches, NVR with Hard disk & connecting cables, Configuration software, LED Tv, Mounting structures for CCTv camera as per requirements, with all required Hardware & accessories. Refer Technical Specification " Annexure- CCTv and BOQ-CCTv" for supply of all items. Pre-dispatch testing and submission of test report prior-installation is in also supplier's scope.

B.1C.2 : SCOPE of Installation, commissioning & testing for CCTv system: The scope of Installation, commissioning and testing of C&I system comprises of following scope of works, mentioned below.

a. Preparation of Installation, erection layout drawing for CCTV, Network switches & NVR as per plant layout and requirement of area to be covered under CCTv surveillance.
b. Installation of CCTV camera as per Layout drawing at different plant location.
c. Installation of Network switches, NVRs, Installation racks as per Layout.
d. cat-6/7 cable Laying for all CCTV cameras, Network switches, NVR, LED TV display, etc.
e. Any other requirement of installation of camera /cable laying, which is not mentioned in approved Drawing layout, but required for commissioning, same shall be laid and configuration of switches to be done by supplier/bidder.

f. Installation, configuration of all switches, NVRs as per requirements.
g. Installation of Led TVs and required cabling work.
h. Interfacing of Local CCTv network with Fibre Optic Cable Network, required fibre optic signal testing, termination and configuration work, all are in supplier/bidders scope.
i. Supplier has to Provide all required mounting fixtures, hardware, mounting structures for all system components like CCTV cameras, NVRs, LED TVs, Network Switches as per standard Installation & Commissioning requirements.
j. complete testing of CCTV system with installed NVRs, LED display.
k. Preparation & submission of Commissioning test report for whole system.

Technical Qualification criteria for supplier/OEM/Bidder for CCTV surveillance system .

1. Supplier has to offer all the items and their quantity as per BOQ_CCTv. All supplied items & other required accessories shall be as per technical specification, mentioned in Section- C with detailed specification, Make, Model no, of offered items shall comply to technical specification. The approved/suggested Makes are mentioned merely for guidance purpose, kindly refer Section-V of GCC (General contract conditions) of tender document.

2. All the offered items of BOQ shall be from OEM / OEM Authorised Distributor/supplier.

3. Bidder has to submit details, make, model no. or data sheets of all offered items in technical Bid. Failure to do so, the technical Bid submitted by Bidder is liable for rejection without any further clarification.

4. Supplier has to submitted all the certificates, asked in item's Detailed Technical specification in advance along with technical bids.

Part B- 1D	**Detailed Engineering work, Fabrication, supply, Installation, commissioning & testing of Different types Fire Alarm Sensors, Manual call points, Beam detectors, FAS monitoring & control panel, Repeater panels, Hooters, Linear heat sensing cables with required accessories, Hardware, mounting structures, Testing and documentation work etc.**

B.1D.1 : SCOPE of Supply of Materials for Fire alarm System (FAS): Fabrication, Supply, & Testing of Different types of addressable Fire alarm sensors Like Multi-sensors, Beam detector, Manual call Points, FAS monitoring & control panel, Repeater Panels, Panel communication card/Hardware, Hooter, connecting cables, Network cables, FAS monitoring software with Desktop Pc, Gateway-router/Protocol convertor for communication of panels, linear heat sensing cables and other all required accessories & hardware. Refer Technical Specification " Annexure- FAS and BOQ-FAS" for supply of all items. Pre-dispatch testing and submission of test report prior-installation is in also supplier's scope.

B.1D.2 : SCOPE of Installation, commissioning & testing for FAS system: The scope of Installation, commissioning and testing of FAS system comprises of following scope of works, mentioned below.
a. Preparation of Installation, erection layout drawing for FAS which includes, Finalisation of sensor location, Manual call points, repeater panel, as per plant layout and requirement of area to be covered under FAS.
b. Installation of all sensors, devices as per Layout drawing.
c. required cabling for interfacing of all sensor with FAS monitoring & control panel.
d. Installation of Repeater panel, required cabling and its interfacing with FAS monitoring & control panel of using Communication equipment (gateway/ Protocol convertor).
e. Interfacing of Main FAS monitoring & control panel with existing FAS panel of plants over serial/Ethernet based communication.
f. Installation and Commissioning of fire alarm monitoring software with required Desktop Pc.

g. testing of all sensors, Manual call points, main FAs control panel, Repeater panel and PC based Monitoring system.

h. Laying of Heat sensing cables in cable tray, interfacing of same in FAS panel, testing

i. Installation & Commissioning: Installation & interfacing of all the fire sensor, FAS control panel, repeater panel & associated cabling work , Laying of heat sensing cables in Cable tray, installation & interfacing of Manual call points, alarm annunciators at desired location to be done as per duly approved FAS Installation & commissioning designed Layout. Extension of Fire alarm & annunciation to remote location using repeater panel shall also be done by supplier. Interfacing of Old existing FAS(Make: Honeywell-Morley) with new planned FAS shall be done by supplier only. Details of existing FAS, which is to be integrated with planed FAS, will be provided to successful bidder at the time of placement of work order. However for estimation of FAS for NIT bidding, bidder can visit the BARC site prior to bidding. All expenses of site visit shall be beard by bidder/supplier only.

j. Procurement, installation & commissioning of whole FAS shall be in compliance with the recommendations of the National fire protection association (NFPA) code & shall strictly adhere to IS:2189, EN 54 standards. Procurement shall be done as per attached technical specification, make and model no mentioned in Section- C (**C.1D.1)**, kindly note that only particular make and model no mentioned in technical specification will be considered, offer received for different make will not be considered, however model no of same make can be acceptable, subjecting to compliance in communication protocol with existing pre-installed fire alarm system. The make and model nos which are mentioned in BOQ_FAS are being used in existing, pre-installed fire alarm system.

k. Pre-dispatch & after supply inspection & testing: Pre-dispatch inspection of Complete fire alarm System with all required Hardware & accessories will be done at OEM site before supply of material. Test will be done as per testing criteria mentioned in Annexure-5. Supplier has to arrange & bear the cost of the Pre- dispatch inspection. OEM shall have testing facility Laboratory, accredited with NABL. OEM shall also need to produce the Required Certificates mentioned in technical specification at the time of inspection**.**

l. Preparation of Commissioning & testing report and submission at the time of system commissioning.

Technical Qualification criteria for supplier/OEM/Bidder for Fire Alarm System.

1. All the offered items of BOQ shall be from OEM / OEM Authorised Distributor/supplier.

2. OEM / OEM Authorised Distributor/Bidder has to Provide the test setup facility (accredit with NABL) to carry out required test on supply item at the time of Pre-Dispatch Inspection as per Tender Specification requirements

Part B- 1E	**Detailed Engineering work, Fabrication, supply, Installation, commissioning & testing of UPS power supply system with rated batteries & with required accessories, Hardware, mounting structures, Testing and documentation work etc.**

B.1E.1 : Scope of supply for UPS power supply system: Fabrication supply & testing of UPS (10 KVA), Batteries, Battery stand, Power isolation DB(power Distribution Box) with MCBs (Input & out put Power), Isolation MCBs for Batteries, MCBs/selector switch for Manual Bypass of Power, Surge Protecting device (SPD) for UPS o/p power and other all required accessories & hardware. Refer Technical Specification " Annexure- UPS and BOQ-UPS" for supply of all items. Pre-dispatch testing and submission of test report prior-installation is in also supplier's scope.

B.1E.2 : SCOPE of Installation, commissioning & testing for UPS power supply system: The scope of Installation, commissioning and testing of **UPS power supply** system comprises of following scope of works, mentioned below.

a. Submission of Pre-installation UPS performance testing trial reports and Power distribution Layout drawing approved by BARC engineer/Engineer incharge.
b. Installation of UPS with required structure/Tray (MS make, powder coated)
c. Installation of Batteries in Battery stand (MS make, Powder coated).
d. Installation of MCBs for Battery Isolation, a proper arranged structure on Battery stand shall be used for the same.
e. Installation of MCB for UPS power Isolation.
f. Connection of Batteries with UPS.
g. Installation of Power Distribution DB for UPS I/P & O/P power with Proper rating of MCBs.
h. Installation of Surge Protecting device at UPS O/P power distribution board and Installation of Selector/switch for Manual Power Bypass for UPS.
i. Laying of power cable from UPS to PLC panel and nearest Power distribution DB with proper glanding.
j. Complete testing of UPS & Batteries with Load, Preparation & submission of commissioning report.

Technical Qualification criteria for supplier/OEM/Bidder for UPS Power system .

1. Supplier has to offer all the items and their quantity as per BOQ_UPS. All supplied items & other required accessories shall be as per technical specification, mentioned in Section- C with detailed specification, Make, Model no, of offered items shall comply to technical specification. The approved/suggested Makes are mentioned merely for guidance purpose, kindly refer Section-V of GCC (General contract conditions) of tender document

2. All the offered items of BOQ shall be from OEM / OEM Authorised Distributor/supplier.

3. Bidder has to submit details, make, model no. or data sheets of all offered items in technical Bid. Failure to do so, the technical Bid submitted by Bidder is liable for rejection without any further clarification.

4. Supplier has to submitted all the certificates, asked in item's Detailed Technical specification in advance along with technical bids.

Part B- 1F	**Detailed Engineering work, Fabrication, supply, Installation, commissioning & testing of Access control system with RFID card reader, Double lane Turnstile gate with Manual Operated Material Entry gate, masking Panel, required Motor, accessories & Hardware, mounting structures, Testing and documentation work etc.**

B.1F.1 : Scope of supply for Access control system: Fabrication, supply & testing of Double lane Turnstile gate, Material Entry gate(Manual Operation), RFID card reader to control Access, Required Motors, accessories for operation of turnstile and hardware. Refer Technical Specification " Part- C and BOQ-ACS" for supply of all items. Pre-dispatch testing and submission of test report prior-installation is in also supplier's scope.

B.1.F.2: **SCOPE of Installation, commissioning & testing for Access control system:** The scope of Installation, commissioning and testing of **Access control system** comprises of following scope of works, mentioned below.

a. . Submission of Performance test certificates for all supply items from OEM.
b. Installation of Double Lane Turnstile Gate.
c. Installation of Material Entry Gate.
d. Installation of Masking Structure.
e. Installation of Motor assembly for Turnstile gate Operation
f. Installation of Power supply unit ,required power & network cabling work.

g. Installation of Rfid Card Readers at entry and exit(both side) of a single gate, Total 04 Nos of RFID card readers shall be installed and configured.
h. Interfacing, testing of rfid card reader with Access control system LAN of BARC plant.
i. Required Configuration work for RFID and access control system.
j. Complete system testing and submission of commissioning report.

Technical Qualification criteria for supplier/OEM/Bidder for Access control system.

1. Supplier has to offer all the items and their quantity as per BOQ_ACS. All supplied items & other required accessories shall be as per technical specification, mentioned in Section- C with detailed specification, Make, Model no, of offered items shall comply to technical specification. The approved/suggested Makes are mentioned merely for guidance purpose, kindly refer Section-V of GCC (General contract conditions) of tender document
2. All the offered items of BOQ shall be from OEM / OEM Authorised Distributor/supplier.

3. Bidder has to submit details, make, model no. or data sheets of all offered items in technical Bid. Failure to do so, the technical Bid submitted by Bidder is liable for rejection without any further clarification.

PART –C

General Specification & BOQ for Supplied Items & Detailed Scope of Work

Important Points:

1. BOQ: Bill of Quantity for all supply materials and Scope of work, including Installation & commissioning are mentioned for all systems are Mentioned in respective system's BOQ.

2. Please refer Schedule –A of NIT, mentioned under Section-VIII of Tender Documents and BOQ of Individual system for bidding of price against the each item Mentioned in Schedule- A/ Price_Bid of NIT.

3. All individual supply material of a particular system, shall be covered in different items of Schedule –A. Refer BOQ table column " Item no. as Per NIT Schedule- A" for Price bidding. Example: Like Differential Pressure Transmitters, Pressure Transducer, Pressure gauges, Magnahlic gauges will be covered in Item Sr. No 01 of Schedule- A/ Price_Bid (fabrication supply, detailed engineering of Pressure Measurement system)

4. Refer BOQ for Quantity of supply Material

5. If there is any discrepancy regarding Quantity of Supply Material Mentioned in this document, other than BOQ. The Quantity mentioned in BOQ will be considered for Bidding only.

C.1A.1: Bill of Quantity (BOQ) for work of " Detailed Engineering work, Fabrication, supply, Installation, commissioning & testing of Different types of Field Instruments, Cables, cables trays, SS tubes, fittings & valves for C&I system with required accessories, Hardware, mounting structures, etc"

BOQ_C&I: BOQ for Fabrication, Supply, Installation & testing work for C&I system

Sr. no.	Description of Item	Brief Specification	**Quantity**	**Unit**	**Item no. as Per NIT Schedule- A (To be covered in NIT Schedule- A, item)**
01	Differential Pressure Transmitters (pressure Measurement)	Range: Low Range (Refer DPT_spec2 for detail spec)	30	Nos.	Item Sr. No 01 of Schedule- A (fabrication supply, detailed engineering of Pressure Measurement system)
02	Differential Pressure Transmitters (pressure Measurement)	Range: High Range (Refer DPT_spec1 for detail spec)	10	Nos.	
03	Pressure Transducer	(10 Kg/cm2, with 4-20 Ma o/p) Refer PT_spec	10	Nos.	
04	Pressure Guauges (0 - 10 kg)	Range: 0 -10 Kg/Cm2 Refer PG_spec	10	Nos.	
05	Magnahlic gauges	Range: 0–2" to 4" mmWC Refer MG_spec	10	Nos.	
06	Temperature Transmitters	Universal Temperature I/P, 4 -20 mA O/P (Refer Temp_spec)	30	Nos.	Item Sr. No 04 of Schedule- A (fabrication supply, detailed engineering of Temperature Measurement system)
07	N Type Thermocouple(MI, sheathed (Inconel 600), Length 700mm	Refer TC_spec1	10	Nos.	
08	T Type Thermocouple(MI, sheathed (SS), 700 mm length	Refer TC_spec2	30	Nos.	

09	Metal Tube Rotameters (500 LPM)	Range: 0 – 500 LPM Refer Rota_spec1	02	Nos.	Item Sr. No 02 of Schedule- A (fabrication supply, detailed engineering of Flow Measurement & Control system)
10	Metal Tube Rotameters (200 LPM)	Range: 0 – 200 LPM Refer Rota_spec2	05	Nos.	
11	Thermal Mass Flow Meter (600 SCFM)	Range: 0 -600 SCFM Refer TMFM_spec1	04	Nos.	
12	Thermal Mass Flow Meter (150 -200 CMH)	Range: 0 -200 CMH Refer TMFM_spec2	02	Nos.	
13	Thermal Mass Flow Controller	Range: 0 – 50 Lpm Refer TMFC_Spec	05	Nos.	
14	Ultrasonic flow meters (500 lPm)	Range: 0 -500 Lpm Refer UFM_Spec	10	Nos.	
15	Radar Level Transmitters	Range: 0 -10 Meters Refer: Radar_spec	05	Nos.	Item Sr. No 03 of Schedule- A (fabrication supply, detailed engineering of Miscellaneous Process Measurement & Control system)
16	Load cell with transmitter unit	Range: 0 – 500 kg Refer LDC_spec	08	Nos.	
17	Purge Rotameters with DP regulators	Range: 5 to 60 NLPH Refer Rota_spec	100	Nos.	
18	PRVs (0- 10 Kg)	Range: 0 -10 Kg/Cm2 Refer PRV_spec	10	Nos.	
19	Single Pair cables	Refer Cable_spec	5000	Meters	Item Sr. No 10 of Schedule- A (fabrication supply of single Pair Instrumentation cable
20	06 Pair Cable	Refer Cable_spec	2000	Meters	Item Sr. No 11 of Schedule- A (fabrication supply of 06 Pair Instrumentation cable
21	20 Pair Cable	Refer Cable_spec	3000	Meters	Item Sr. No 12 of Schedule- A (fabrication supply of 20 Pair Instrumentation cable
22	10 Pair Cable	Refer Cable_spec	2000	Meters	Item Sr. No 13 of Schedule- A (fabrication supply of 10 Pair Instrumentation cable
23	SS tubes, ¼” Seamless	Bright annealed, cold roll, ASTM A269, SS 304 Refer Tube_spec	2500	Meters	Item Sr. No 05 of Schedule- A (fabrication supply of ¼ “ SS tubes
24	SS tubes, 10 mm OD Seamless	Bright annealed, cold roll, ASTM A269, SS 304	500	Meters	Item Sr. No 06 of Schedule- A (fabrication supply

		Refer Tube_spec			of 1/2 " SS tubes
25	SS tube Fittings (as per attached annexure-Tube fittings)	Refer Fittings_spec	01 (as per annexure-Tube fittings)	Set	Item Sr. No 07 of Schedule- A (fabrication supply of SS tubes fittings
26	Junction Boxes (300(H) X 300(W) X 150(D)) with TBs(50 Min in each)	MS, Powder Coated	25	Nos.	Item Sr. No 08 of Schedule- A (fabrication supply of Valves & Accessories
27	SV(3/2 way) valves	3/2 way, NC, 48 VAC, 4-5 mm Bore), Refer SV_spec	150	Nos.	
28	Needle Valve ½",SS304	Refer NV_spec	10	Nos.	
29	Needle Valve ¼",SS304	Refer NV_spec	50	Nos.	
30	Ball Valve ¼" ,SS 304	Refer NV_spec	50	Nos.	
31	Ball Valve ½", SS 304	Refer NV_spec	10	Nos.	
32	1½"- 2" Header	Refer PHD_spec	10	Nos.	
33	Cable Trays (300 mm)	Refer CBT_spec, Cable tray laying with support structure	250	Meter	Item Sr. No 09 of Schedule- A (fabrication supply & Installation of Cable Tray
34	Cable Trays (100 mm)	Refer CBT_spec, Cable tray laying with support structure	500	Meter	
35	Cable tray laying with support structure	As per Requirements, Refer Schedule- A of NIT (approx.= 750 Mtrs)	750	Mtrs	
36	Cable laying work	As per Requirements, Refer Schedule- A of NIT (item no. 21 of Schedule- A)	10,000	Meters	Item Sr. No 21 of Schedule- A (Cable laying work with required accessories and Hardware
37	Accessories for cable laying	As per Requirements	01	Set	
44	Installation of SS tubes & fittings	As per Requirements of SS tubbing work. Refer NIT Schedule- A for quantity	1500	Meters	Item Sr. No 23 of Schedule- A (SS tube Laying & installation, commissioning & testing of Tube Fittings
45	Leak testing for SS tubbing work	As per Requirements	01	Job.	
46	Installation of Field Equipments(major equipments)	As per Requirements*	01 lot *: Refer Schedule –A , Item No. 25, Approx. quantity 500 Nos.		Item Sr. No 25 of Schedule- A (Installation of Field Instruments with required accessories, Hardware & tagging
46	Installation of SVs & other valves etc	As per Requirements*			
47	Installation & commissioning of Minor field instruments/device	As per Requirements*			

C.1A.2: Detailed Technical specification for All Supply Items and Scope of Installation & testing Mentioned in BOQ_C&I

Specification for DP transmitters: DP_Spec1

Table: DP_Spec1: DP transmitter Range: High Range or better as Per Specification Mentioned below

The approved/suggested Makes: E&H, ABB, Rosemount, Fuji or equivalent complying with Tender specification

Sr. no	Feature	Specification
1.	Reference Accuracy	± 0.065% of calibrated Span or better (includes hysteresis, Non- linearity & repeatability) as long as span is greater than or equal to Upper Range limits (URL)/10
2.	Range Requirement	URL & LRL shall be in the range of: 1. Transmitter, having URL in the range of 4000 mmWC to 13000 mmWC, are acceptable. 2. Transmitter, having LRL in the range of Range: -4000 mmWC to -13000mmWC are acceptable.
3.	Stability	Stability of Transmitter shall be complied either of the following specifications. Option1: ±0.2% URL for 10 Years or better OR Option2: ±0.025% URL/Year for at least 05 years or better OR Option3: ±0.05%URL for 5 years
4.	Static Pressure Limit of Diaphragm	100 bar or better
5.	Turn down Ratio	100 or better
6.	Response time (time constant @ 63.2 % of total step change)	150 ms or better
7.	Calibration Certificate	Calibration & Testing certificate (traceable to NIST/NABL)
8.	Output & Communication Protocol	Two-wire, 4-20 mA according to NAMUR NE43specification, with superimposed digital communication (HART Protocol).
9.	HART Compatibility	HART compatible device, Must have registered on HART Foundation A copy of Registration certificate shall be submitted along with offer
10.	HART Configuration	Transmitter shall be fully configurable for following parameters using standard Hand-held HART device. Span & Zero adjustment within range of LRL & URL, Zero Elevation and Suppression, Range, URV, LRV, Sensor trim, span trim, Zero trim, Current trim and other generic configurations.
		HART communication should be functioning smoothly with maximum loop resistance at 24V DC supply.
11.	Fault alarm /Diagnostics	In case of sensor or circuit failure, the self-diagnostics drives the output as per NAMUR NE43 specification
12.	Zero Elevation and Suppression	Continuously adjustable within the LRL & URL, considering span in range of min span to max span
13.	Damping Time	Configurable using digitally from HART device

14.	Span and zero adjustment	Digitally from HART device required and optionally from local device.
15.	Supply voltage & Load Requirement	24 V DC, Transmitter shall drive load of 550 Ohms at 24 Volt DC power supply.
16.	Environmental Conditional limit	1. Ambient Temperature Limit: -10 to 85 Deg. C or better 2. Process Temperature Limit 100 Deg. C or better 3. Humidity Limit: 0 to 95% RH
17.	Protection Circuit	Reverse Polarity & Short Circuit Protection
18.	Sensor Element	
19.	Type of Primary Element	Capacitive/ Resonant silicon/Piezo-resistive /Dual Inductance sensor
20.	Secondary Sensor	Secondary Sensor required to counter temp effect
21.	Local Display	Configurable Alphanumeric LCD Display required
	Wetted Part	
22.	Sensing Diaphragm	SS 316 / SS316L /Hastelloy
23.	Process O-Ring Material	PTFE/VITON
24.	Process Connection	¼" NPT (F)
25.	Valve & plug arrangement for Drain/Vent ports	316LSS, 2 nos. of Valve & plug for drain/vent ports required on both HP & LP side. Preferable port size for drain/vent port is 1/4" NPT(F)
	Non- Wetted Part	
26.	Fill Fluid for Sensing Diaphragm	Silicon Oil
27.	Electronic Housing	Di-cast Aluminium
28.	Electrical Cable entry	½" NPT with supply of SS double compression gland for unarmoured cable.
29.	Enclosure protection	IP 66 or better
30.	Identification/Name plate with tag	SS Plate with Tag
31.	Mounting	316 SS Universal Mounting Bracket with SS Nuts & Bolts for Vertical / Horizontal Mounting on 2" Pipe,
32.	Additional Accessories required	SS316/SS316L 3-way valve Manifold with double compression Teflon gland packing and non-rotating needle valve plug. make, it shall be leak tight for class-VI.

Table: DP_Spec2: DP transmitter Range: Low Range or better as Per Specification Mentioned below

The approved/suggested Makes: E&H, ABB, Rosemount, Fuji or equivalent make complying with Tender specification

Sr. no	Feature	Specification
1.	Reference Accuracy	± 0.1% of calibrated Span or better (includes hysteresis, Non- linearity & repeatability) as long as span is greater than or equal to Upper Range limits (URL)/10
2.	Range	URL & LRL shall be in the range of: 1. Transmitter, having URL in the range of 400 mmWC to 1000 mmWC, are acceptable. Transmitter, having LRL in the range of Range: -400mmWC to -1000mmWC are acceptable
3.	Stability	±0.2% URL/year or better

4.	Static Pressure Limit of Diaphragm	100 bar or better
5.	Turn down Ratio	20 or better
6.	Response time	350 ms or better
7.	Calibration Certificate	Calibration & Testing certificate (traceable to NIST/NABL)
8.	Output & Communication Protocol	Two-wire, 4-20 mA according to NAMUR NE43specification, with superimposed digital communication (HART Protocol).
9.	HART Compatibility	HART compatible device, Must have registered on HART Foundation A copy of Registration certificate shall be submitted along with offer
10.	HART Configuration	Transmitter shall be fully configurable for following parameters using standard Hand-held HART device. Span & Zero adjustment within range of LRL & URL, Zero Elevation and Suppression, Range, URV, LRV, Sensor trim, span trim, Zero trim, Current trim and other generic configurations.
		HART communication should be functioning smoothly with maximum loop resistance at 24V DC supply.
11.	Fault alarm /Diagnostics	In case of sensor or circuit failure, the self-diagnostics drives the output as per NAMUR NE43 specification
12.	Zero Elevation and Suppression	Continuously adjustable within the LRL & URL, considering span in range of min span to max span
13.	Damping Time	Configurable using digitally from HART device
14.	Span and zero adjustment	Digitally from HART device required and optionally from local device.
15.	Supply voltage & Load Requirement	24 V DC, Transmitter shall drive load of 550 Ohms at 24 Volt DC power supply.
16.	Environmental Conditional limit	1. Ambient Temperature Limit: -10 to 85 Deg. C or better 2. Process Temperature Limit 100 Deg. C or better 3. Humidity Limit: 0 to 95% RH
17.	Protection Circuit	Reverse Polarity & Short Circuit Protection
18.	Sensor Element	
19.	Type of Primary Element	Capacitive/ Resonant silicon/Piezo-resistive /Dual Inductance sensor
20.	Secondary Sensor	To counter temp effect
21.	LCD Display	Configurable Alphanumeric LCD Display required
	Wetted Part	
22.	Sensing Diaphragm	SS 316 / SS316L /Hastelloy
23.	Process O-Ring Material	Buna-N/PTFE/VITON
24.	Process Connection	¼” NPT (F)
25.	Valve & plug arrangement for Drain/Vent ports	316LSS, 2 nos. of Valve & plug for drain/vent ports required on both HP & LP side. Preferable port size for drain/vent port is 1/4” NPT(F)
	Non- Wetted Part	
26.	Fill Fluid for Sensing Diaphragm	Silicon Oil
27.	Electronic Housing	Di-cast Aluminium
28.	Electrical Cable entry	½” NPT with supply of SS double compression gland
29.	Enclosure protection	IP 66 better
30.	Identification/Na me plate with tag	SS Plate with Tag
31.	Mounting	316 SS Universal Mounting Bracket with SS Nuts & Bolts for Vertical / Horizontal Mounting on 2” Pipe,
32.	Additional Accessories required	SS316/SS316L 3-way valve Manifold with double compression Teflon gland packing and non-rotating needle valve plug. make, it shall be leak tight for class-VI

Type Test Requirement of Electronic Smart DP Transmitters as per IEC 60770/61298

Sr. No.	Test Name	Reference No.	Type Test	Remark
01	Inaccuracy & Measured Error	IEC 61298-2	Performance Test	5 point calibration test(1*) 20 point calibration test (2*)
02	Non- Linearity	IEC 61298-2	Performance Test	
03	Hysteresis	IEC 61298-2	Performance Test	
04	Repeatability	IEC 61298-2	Performance Test	
05	Dead Band	IEC 61298-2	Performance Test	
06	Ambient temperature test	IEC 61298-3	Temp. Related test	2*
07	Mounting Position	IEC 61298-3	Functional test	2*
08	Over range	IEC 61298-3	Functional test	2*
09	Reverse Polarity Protection	IEC 61298-3	Functional test	2*
10	Source Impedance	IEC 61298-3	Functional test	2*
11	Insulation Resistance	IEC 61298-3	Functional test	2*
12	Out Put Load	IEC 61298-3	Functional test	2*
13	Electrical Out put load at full span		Functional test	2*
14	Supply Voltage Variation Test			2*
15	Static Pressure Test			2*
16	3 valve manifold Leakage test		Leakage test	2*
17	HART Communication test			1* : HART configurator will be used for 5 point calibration test

1*: Test will be carried on 10% of item of each range (range 1&2), randomly selected from full lot of material available for Inspection

2* Test will be carried on a single item of each range (range 1&2), randomly selected from full lot of material available for Inspection

Note: Supplier/Vendor/OEM shall have NABL/NIST calibrated & certified instruments & test setup required for all test mentioned in annexure-1. Test cost shall be inclusive for all offered items

Table: Temperature Transmitter Specification: Temp_speac

The approved/suggested Makes: Raddix/PR electronics/ Applisense or **equivalent make complying with Tender specification**

Sr. No	Parameter/s	Specification
1	Input type	independently configurable inputs, including 2- and 3-wire RTDs, thermocouples, mV, 2- and 3- wire ohm, and 4-20 mA signals
2	**Type of thermocouple inputs and Accuracy & Stability Specification**	Type T, N, K, J,E, R,S Accuracy for Thermocouple: (E, J, K, T, N), Pt-100, mV, Ω: 0.1% of FS Accuracy for Thermocouple (B,R,S): 0.25% FS Stability: 0.1% FS per Year
3	Type of Transmitter	DIN Rail Mounted
4	Dimension	**Width shall not be more then 15mm**

5	Output	2 wire, 4 – 20 mA, linear with temperature
6	No of O/P channel	01
7	Accuracy	+/-0.1 % of full scale +/- 0.5 Deg C
8	Pt 100 input	BS EN 60751
9	Thermal Stability	(-20 to 50) Deg C
10	Response	100 ms to reach 70 % of final value
11	Calibration Option	Custom Trim
12	Power supply	10 to 30 V DC(or better), 2- wire, loop power support
13	Diagnostics	Yes, Basic diagnostics,
14	Isolation & Sensor break Output	Minimum 500 V AC galvanic isolation (by optocouplers or transformer isolation) between input and output. Sensor Break O/P : Lo < 3.4mA or Hi >20.8mA (user set)
15	**Open circuit detection & Protection circuit**	Yes, it should be available. Output current to upscale in case of sensor error and reverse polarity protection shall be provided
16	Programming or Configuration	Fully Programmable for Input type & Range, Configuration of input types, ranges, Tag, diagnostics, calibration, error trimming through programming software or through DIP switches or menu driven keys and display.
17	Ambient RH (non condensing)	95%
18	Copies of test Reports/certificates and other certifications	To be provided
19	Certification	ISO
20	Availability of test report from central Govt/ NABL/ILAC accredited lab covering all parameters	Yes, Required
21	Pre-Dispatch Inspection test	Calibration test for N type & T type thermocouple, RTD (pt-100) input, CJC response test, Programming or Configuration test, **Open circuit detection test**

Tender Specification of SS Tube Fittings: **Fitting_Spec**

The Approved/Suggested Makes: Panam\Sealexcel\astec\Swagelok\Parker| Havi Valves & fittings or equivalent

Sr.	Specification	Requirement
5.1	MOC	SS 316 as per ASTM A276 / ASTM A182 or equivalent standard
5.2	Body Construction	For straight fittings bar stock and shaped bodies from forging.
5.3	Type of fitting	Double ferrule Compression type tube fittings. Fittings shall be of flare less compression type having four-piece (for double compression type) construction consisting of two ferrules, nut and body
5.4	Operating temperature	0 - 200deg C
5.5	Pressure Rating for	As per ASME B31.3 or equivalent.

	fittings	
5.6	Media	Air/ Steam
5.7	Ferrules	Both ferrules shall be SS316 with edge hardening treatment (front edge Hardening)
5.8	Hardness of ferrule edge	Rockwell B (HRB): 85 – 90. Fittings Hardness should be more than by Hardness of 10HRB to SSTubes, SS Tubes Desired Hardness (HRB 70 -80, The approved/suggested is HRB75)
5.9	Interchangeability	Nuts and ferrules of a particular size shall be interchangeable for each type
5.10	Testing Facilities and certificate.	All the quoted fittings shall be type tested for Thermal Cycling Test, Proof test, Shock Test, Vibration Test, Hydraulic Pressure testing, Pneumatic Leak Test, Helium Leak Test, Impulse Cycling Test. The supplier is responsible to arrange for testing facilities and test Certificates for above tests by either from OEM or by third party testing lab/labs. Test certificates shall be submitted for review and record.
5.11	Acceptable Swaging Procedure.	One & quarter turn gaugeable/swaging procedure in line with Swagelok Standard. (The ferrule should grasp tightly around the tube with no damage to tube wall)
5.12	Pull force for slip of ferrule	After swaging, the fitting shall not fail and loose grip on tube for at least the pressure rating of the pipe thread specified.
5.13	Heat code traceability	Stamped/engraved on the fittings.
5.15	Finish of the fittings	Scratch & burr free.
5.16	Plating/Coating	Inside Threads of fitting Cap shall be Silver plated for anti-galling property.
5.17	Compliance of fittings	BS4368 Part-IV or equivalent.
5.18	Compliance for NPT thread Specification	ASME B1.20.1, SAE AS71051 or equivalent Standard.
5.19	Standard of testing	ASTM F-1387 or equivalent.
5.20	Corrosion resistance Standard	NACE MR-175 or equivalent
5.21	Identification of Metric & Fractional Tube	Step shoulder shall be provided on body and nut to identify metric tubes fittings from fractional/imperial tube fittings.

SS Tube Specification: Tube_Spec

Fabrication & Supply of Cold Finished Bright Annealed Seamless SS tubes as per SS tube Specification.

Cold Finished Bright Annealed Seamless Instrument Tubes confirming to ASTM A-269 TP 304 L

Material shall be as per ASTM A-269 TP 304 L and other applicable standards as mentioned in this tender. The tubes shall be cold finished, bright annealed, and shall have plain ends. Material's inspection/test and tolerance requirements shall be as per ASTM A-269, ASTM A-1016 and other applicable standards.

Applicable Codes & Standards:

h. ASTM A-269: Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service

i. ASTM A-1016: Standard Specification for General Requirements for Ferritic Alloy Steel, Austenitic Alloy Steel, and Stainless Steel Tubes.

j. ASTM A-370: Standard Test Methods and Definitions for Mechanical Testing of Steel Products.

k. ASTM A-380: Standard Practice for Cleaning, Descaling and Passivation of Stainless Steel Parts, Equipment and Systems.

l. ASTM A-450: Section 11: Specification for General requirements for carbon and low alloy steel tubes for Surface finish

Tolerance on Quantity: The allowable tolerances on quantity are as below:

i) Tolerance on quantity of individual tubes Length: (-) 0% and (+) 5%.
ii) Tolerance on total quantity: (-) 0% and (+) 5%.

Material Properties and Requirements:
All the tubes shall conform to the requirements of ASTM A-269 TP 304 L and ASTM A-1016. Other technical requirements are as below.

Condition: The tubes shall be cold finished, bright **annealed** condition.

Finish, Straightness, & Surface Quality: Bright Annealed (BA) Cold Rolled. Annealing needs to be done in a very closely controlled inert atmosphere to avoid any oxidation or scaling of the surface.
tube shall be cut axially & visually examined. The internal surface shall be mirror like finish. The average roughness (Ra) value shall not be more than 32 Micro inch (32 Ra). Tubes shall be completely free from surface defects like grind/deep-scratch, die-marks, crack, anneal pits, skin burns etc. The end of the tubes shall be free from any kind of cracks and burrs. Grinding/machining or repair welding on the finished tubes shall not be permitted.
Chemical Composition: Chemical composition shall be as per ASTM A-269 TP 304 L
Mechanical/Physical Properties: Mechanical and other physical properties of the tubes shall conform to the requirements of ASTM A-269 and ASTM A-1016. Mechanical test includes flaring test, hardness test etc. Hardness of the material shall be between **70 HRB to 80 HRB**. 75 HRB is most preferable.
Dimensional Tolerance: As per ASTM A-1016 & A-269

Outside & Inside Dia. Inspection:

Outside Dia.: All the tubes will be passed through a ferrule gauge to check the uniformity of the Outside dia. of the tube. It shall not be obstructed through-out the length of the tube.
Inside Dia: The ball of the dia. 3.69 mm & 8.68 mm will be passed through all the tubes for the sizes of OD 6.35 mm & 12.7 mm respectively. The ball shall come out without any hindrance.

Cleanliness: Tubes shall be cleaned by passing “pull-through” rag through the tubes. The tub shall be passed as “clean” when the “pull-through” comes out clean.

Product Marking: Each tube shall have chemical etch mark at least at ends clearly indicating grade of material as “ASTM A-269 TP 304, SEAMLESS”, Size, Thickness, Manufacturer’s name or brand etc. as approved by the purchaser. Marking paint/ink shall not contain detrimental amounts of harmful metal or metal salts which cause corrosive attack on the parent metal**.**

OEM of the SS Tube shall have, ISO 9001:2008 approved Procedure for Quality assurance of the final product. OEM shall be ISO -9001 certified company. Copy of the ISO-9001(Latest) shall be submitted along with the SS Tube Detailed specification.

The approved/suggested Makes of SS Tube: Ratanmani, REMI Edelstahl Tubulars, Sandvik, Panam, Astec, Subhlakshmi metals or equivalent Make complying with tender specification of SS tubes.

Technical Specifications of Cables: Cables_spec

Technical Specification of Single & Multipair, Shielded, Braided/Armoured Signal Cables

1. BRAIDED, MULTISTRAND, TWISTED PAIR, *SINGLE PAIR* SIGNAL CABLE

1.0	Conductor	1.0 mm ² size, copper conductor (conductor size: 0.2mm; number of strands: 32) Conductor shall consist of stranded, electrolyte annealed, bare copper confirming to Class-5 of IS:8130-1984 & its latest amendments. The dimensions, nominal weights and resistances of conductors shall be in accordance with the values given in IS:8130, Table 1. No joints shall be permitted is copper wire or any core of a pair.
1.1	Current Rating of Conductor	Current rating of all PVC insulated cables shall be as per IS: 3961 and its amendments
1.3	Pair	Two insulated conductors shall be uniformly twisted together to form a pair. Loosely packed pair shall not be acceptable.
1.4	Number of Twisted Pairs	Single pair
1.5	Pair Twisting (No of Twist per Meter)	10 twist per meter (Minimum) or more
1.6	Core Colour	(White & Black)
1.7	Conductor Insulation	1100/600 Volts Grade Heat Resisting (HR) PVC, Type-C, as per IS 5831 & its amendments. The insulation resistance (Dry) of each core shall not be less than 10.0 Mega-Ohm per kilometre at 50°C. The insulation shall be applied by extrusion in one continuous process and shall be homogeneous and free from any joints or repairs it shall fit closely on the conductor but shall not adhere to it so that it is possible to remove easily, without damage to the conductor. The average thickness of the insulation shall not be less than the nominal value as mentioned in IS:5831.
1.8	Insulation Grade	1100/600 Volts
1.9	Inner Sheath	Inner sheath shall be extruded FRLS PVC, FRLS Type ST-2 Category C-2 generally conform to latest revision of IS:5831-1984 and its latest amendments. inner sheath shall be as circular as possible. Re-cycled or Re-claimed material shall not be used. The colour of the PVC for inner sheath shall be grey. For finished cable the specific gravity of the inner sheath shall not exceed 1.50.
1.10	Thickness of Sheath	As per IS:1554 (part 1)/ IS 694 and its latest amendments, 0.6mm (minimum)
1.11	Screening Tape (Shield)	Helically wound aluminium backed mylar foil of thickness 0.05mm (min.) with 25% overlap. A malinex/polyester non-hygroscopic tape of thickness 0.025 mm shall be applied helically with left hand lay with minimum overlap of 30% over screening tape.
1.12	Braiding	By stainless steel wires of 36 SWG with 90% coverage.
1.13	Drain Wire	Tinned copper wire (stranded) of minimum diameter 0.8mm is to be provided in continuous contact with the aluminium side of the screening tape
1.14	Outer Sheath	Extruded, type 1 FRLS PVC as per IS 5831- 1984, thickness: As per IS 1554/ IS 694. Recycled or reclaimed material shall not be used. For finished cable, the specific gravity for outer sheath shall not exceed 1.50. It shall be ensured that outer sheath is circular and ovality (ratio of minor to major dia.) does not exceed 15% of outer sheath. Outer sheath shall also resistant to termites, fungus and rodent attack, certification for the same shall be obtained from Central Power and Research Institute (CPRI). **Colour: Gray/Blue**

2. ARMORED, MULTISTRAND, TWISTED PAIR, *MULTI PAIR* SIGNAL CABLE

2.0	Conductor	1.0 mm ² size, Copper conductor (Conductor size: 0.2mm; Number of strands: 32) Conductor shall consist of Stranded, Electrolyte annealed, bare Copper Confirming to Class-5 of IS:8130-1984 & its latest amendments. The dimensions, nominal weights and resistances of conductors shall be in accordance with the values given in IS:8130, Table 1. No joints shall be permitted is copper wire or any core of single pair.
2.1	Current Rating of Conductor	Current rating of all PVC insulated cables shall be as per IS: 3961 and its amendments or equivalent International Standards
2.2	Pair	Two insulated conductors shall be uniformly twisted together to form a pair. Loosely packed Pair shall not be acceptable
2.3	**Number of Pairs**	**As mentioned in BOQ-C&I (6,12,20)**
2.4	Pair Twisting (Lay of Twisting)	10 twist per meter (Minimum) or more
2.5	Core Colour	Red & Black
2.6	Conductor Insulation	1100/600 Volts Grade Heat Resisting (HR) PVC, Type-C, as per IS 5831 & its amendments. The insulation resistance (Dry) of each core shall not be less than 10.0 Mega-Ohm per kilometre at 50°C. The insulation shall be applied by extrusion in one continuous process and shall be homogeneous and free from any joints or repairs it shall fit closely on the conductor but shall not adhere to it so that it is possible to remove easily, without damage to the conductor. The average thickness of the insulation shall not be less than the nominal value as mentioned in IS:5831.
2.7	Insulation Grade	1100/600 Volts
2.8	Inner Sheath	Inner sheath shall be extruded FRLS PVC, FRLS Type ST-2 Category C-2 generally conform to latest revision of IS:5831-1984 and its latest amendments. inner sheath shall be as circular as possible. Re-cycled or Re-claimed material shall not be used. The colour of the PVC for inner sheath shall be grey. For finished cable the specific gravity of the inner sheath shall not exceed 1.50.
2.9	Thickness of sheath	As per IS:1554 (part 1)/ IS 694 and its latest amendments, 0.6mm (minimum)
2.10	Screening Tape (Shield)	Helically wound aluminium backed mylar foil of thickness 0.05mm (min.) with 25% overlap. A malinex/polyester non-hygroscopic tape of thickness 0.025 mm shall be applied helically with left hand lay with minimum overlap of 30% over screening tape.
2.11	Drain Wire	Tinned copper wire (stranded) of minimum diameter 0.8mm is to be provided in continuous contact with the aluminium side of the screening tape
2.12	Armouring: Material	Galvanized steel wire/flat strips as per IS 3974 or equivalent International Standards
2.13	Type	Flat strip
2.14	Outer Sheath	Extruded, type 1 FRLS PVC as per IS 5831- 1984, thickness: As per IS 1554/ IS 694. Recycled or reclaimed material shall not be used. For finished cable, the specific gravity for outer sheath shall not exceed 1.50. It shall be ensured that outer sheath is circular and ovality (ratio of minor to major dia.) does not exceed 15% of outer sheath. Outer sheath shall also resistant to termites, fungus and rodent attack, certification for the same shall be obtained from Central Power and Research Institute (CPRI). **Colour: Gray/Blue** **Note: The Thickness of PVC outer sheath shall be determined**

		in accordance with procedure laid down in IS: 10810 (part 6)-1984.
2.15	Thickness of Sheath	As per IS:1554 (part 1)/ IS 694 and its latest amendments, 0.6mm (minimum)
2.16	Laying of Cable Pair/Core	The cores of multi-core/pair cables shall be laid up together with suitable lay. The outermost layer shall have right hand lay and the successive layers shall be laid with opposite lay. Way of counting from inner to outer layer continuously shall be unidirectional. Where necessary, the interstices shall be filled with non-hygroscopic material.

Table Identification and Marking - Both Inner and out sheath of cable should bear name of manufacturer, type of cable, Voltage grade, Cable with heat resisting insulation shall be identified by letter "HR 85" marked on it throughout the length. Length of cable should be marked on outer sheath at every 1 meter. Pair identification shall be provided by numbers at regular interval throughout the length of cable.

Packing and Marking - Cable should be supplied in non-returnable, duly painted, MS Drum (maximum length on drum (1000 mtrs for single pair cable)). Each drum shall have tag indicating manufacturer name, year of manufacturing, nominal cross section area of conductor, type of cable (FR-LSH), voltage grade, length of cable.

Bidder Should only quote for FR-LSH PVC (inner and outer sheath) cable. All item will be tested as per standard mentioned in Table-2. All items should successfully pass through type test as per standard. Failure to do so, items will get rejected by purchaser and purchase order will get cancelled.

Successful tenderer will have to present full quantity for inspection to the purchaser and shall carry out necessary tests in his presence, free of cost, to demonstrate the performance of the item as per specification. Purchaser, however reserves the right to carry out additional tests at his/her own cost for the above purchase. Any joint in cable should be avoided.

Details of QA/QC programme testing and manufacturing facilities etc should be accompanied with the quotation.

Quoted items should have compliance with desired specification as per Indian standard mentioned or equivalent **British/IEC/ASTM/IEEE International Standards**, any deviation from specification should be mentioned in detail by supplier.

Table-2 Type of Tests

Sr. No.	Classification of Type Test	Standard to be Followed
1.	Flammability Test by Swedish Chimney method	SS-424-14-75- Class F3, IS 5831
2.	Oxygen Index Test	ASTM D 2863, IS 10810
3.	Smoke Density Test	ASTM D 2843 /77, IS 5831
4.	Temperature index Test	ASTM D 2863, IS 5831
5.	Acid Gas Generation Test	IEC 754 -I, IS 10810
6.	Insulation Resistance Test	IS 5831
7.	Tensile Strength for Conductor	IS 8130, IS 10810
8.	Conductor Resistance Test	IS 10810, IS 8130
9.	Tensile Strength Test (Sheath & Insulation Material)	IS 5831
10.	Elongation Break Test (Sheath & Insulation Material)	IS 5831
11.	Tensile Strength Test (Armoured Steel Wire)	IS 1554(Part1)
12.	Elongation Break Test (Armoured Steel Wire)	IS 1554(Part1

Technical _spec: Mass Flow controller: TMFC_Spec

	GAS (MEDIUM)	AIR
	MAXIMUM FLOW RATE	50 LITERS / MINUTE (LPM)
	WETTED PARTS	STAINLESS STEEL
	SEALS	VITON-A
	END CONNECTION	3/8" COMPRESSION FITTINGS
	DISPLAY	LCD READOUT DISPLAY
	POWER INPUT	12 TO 26 V DC, 650mA MAX.
	OUTPUT SIGNAL	4 TO 20 mA DC
	REMOTE SET POINT	4 TO 20 mA DC
	ACCURACY	+/- 1% OF FULL SCALE
	REPEATABILITY	+/- 0.5% OF FULL SCALE
	TURN DOWN RATIO	40:1

	Test	General specification & Performance test

Technical _spec: Mass Flow Meter: TMFM_Spec

Sr. No	Parameter	Specification
1.	Type	Insertion type flowmeter
2.	Mounting configuration	Remote type configuration. Connecting cable between the flow sensor and Transmitter should be at least 10 metres and should be supplied along with the system.
3.	Process fluid	Dry Air, but sensor should be able to with stand some moisture content and should not get damaged by moisture.
No	**Parameter**	**Specification**
4.	Line pressure	- 20 mmWC gage vacuum (maximum), - 15mmWC gage (under normal condition)
5.	Fluid Temperature	20 to 60 deg C. The flow meter should automatically compensate for temperature changes of process fluid.
6.	Line size	Suitable for Rectangular Ducts as per above Table 1 size
7.	Accuracy of Flow measurement	<= ± 2 % of reading + 0.5% of Full scale flow, testing documentation should be available demonstrating this performance
8.	Repeatability	< ± 0.5% FS
9.	Response Time	should be equal to or less than 1.5 second to reach 63% final velocity value
10.	Temperature and pressure compensation	The flow meter should have inbuilt compensation for Fluid Temperature and Pressure variations
11.	Power supply	24 V DC
12.	Signal Output	4 to 20 mA, for driving 500 ohms load, for linear output of volume flow rate in scmh
13.	Isolation:	All circuits for inputs, outputs and power Supply should be galvanically isolated from each other
14.	Fail safe	Fail safe value should be configurable for the signal output either high output or low output as per standards.
15.	Configuration	The flow meter shall be microprocessor based and programmable. It should be possible to configure the range, unit (for local display), Output, process fluid, Zero and Span, Time Response, Correction factor setting, density etc, at site. Configuration of Flow meter shall be via keypad on instrument or via RS485 communication or via HART.
16.	Self Diagnostics	The Flow meter should have self diagnostic features and it should give error messages in case of fault conditions
17.	Display	Local display of flow rate in SCMH is required on dual-line LED/LCD screen
18.	Housing	Aluminium Die cast or ABS Plastic to IP 65
19.	Ambient Temperature	25 to 45 deg C
20.	Relative Humidity	5 to 95 % RH
21.	Sensor cross section	to be specified by supplier
22.	Mounting	Insertion type mounting with hot tap type mounting arrangement. Necessary Mounting Accessories for Hot Tap type mounting such as Ball Valve should also be mentioned and included in offer.
23.	Process Connection for insertion type	Compression ferrule threaded fitting 1” NPT or to be specified by supplier

24.	Accessories	All Mounting Accessories for mounting of the Thermal Mass Flow meters on to the pipe shall be supplied along with the flow meter
25.	Material of construction of Sensor tubes	SS 304/ SS 316 sensor inside SS protecting tube only exposed at tip.
26.	Calibration	Calibration Certificate of the complete flow meter traceable to NIST or NABL standards shall be provided along with the flow meter. All the reference instruments/ Calibrators used for calibration shall be traceable to national standards.
27.	HART Communication	HART compatible device, Must have registered on HART Foundation A copy of Registration certificate shall be submitted along with offer Transmitter shall be fully configurable for following parameters using standard Hand-held HART device. Span & Zero adjustment within range of LRL & URL, Zero Elevation and Suppression, Range, URV, LRV, Sensor trim, span trim, Zero trim, Current trim and other generic configurations.
28.	PDI Test	General specification & Performance test, HART compatibility test, Self diagnostic & fail safe criteria test as per tender specification

The Approved/Suggested Makes for Mass flow meter & controller: Siera/aalborg/Alicat or equivalent

Technical specification: Pressure Transducers: PT_Spec

. Performance Specification

1.1	Range	0 to 10 Bar
1.2	Reference Accuracy	±1% of Span or better (includes hysteresis, non-linea repeatability)
1.3	Total Error band	±1.5% F.S. over compensated temperature range
1.4	Compensated Temperature Range	0 to 100 Deg. C
1.5	Stability	±0.25% F.S./year
1.6	Response Time	10ms or better
1.7	Proof Pressure	Min 2X of rated range
1.8	Burst Pressure	Min 3X of rated range or better
1.9	Certification	Mentioned below
1.9.1	Calibration Certificate	Calibration & testing certificate (traceable to NIST/NABL)
1.9.2	Agency Approval	CE /CSA /UL or equivalent government recognised government/non-government laboratory
1.10	Operating Pressure Range	4-7Bar
1.11	PDI Test	General specification & Performance test, Proof pressure, Burst Pressure test, NAMUR NE43 specification test as per tender specification requirements.

2. Functional Specifications

1.11	Output	Two-wire, 4-20 mA according to NAMUR NE43 specification
1.12	Output Current Limit	As per NAMUR NE43 specification
1.13	Fault Alarm/Diagnostics	In case of sensor or circuit failure, the self-diagnostics drives the output to upscale min or downscale max current limit as per NAMUR NE43 specification
1.14	Span and Zero Adjustment	**Should be able to adjust by provided external screw terminals or switch or programmable. (programming software, hardware & required accessories should be provided)**
1.15	Zero Balance/Adjustment	± 0.5% F.S.
1.16	Span Setting/Adjustment	± 0.5% F.S.
1.17	Supply Voltage & Load	Range: 10.5V to 30V DC,

	Requirement	with 24V DC ,550 ohms (minimum) load driven capability
1.18	Nominal Supply Voltage & Supply Voltage Error	24V DC < 0.02% per V
1.19	Isolation: Body to any Lead	100M ohms @ 50V DC or better
1.20	Protection Circuit	Reverse polarity, surge & short circuit protection

3. Physical Specifications

1.21	Area Classification:	Non hazardous
1.22	Services/Process Fluid	Steam/Water
1.23	**Material of Construction (Wetted Parts)**	Mentioned below
1.23.1	Housing/Body	316SS/316LSS/304SS
1.23.2	Process Connection	316SS/316LSS/304SS
1.23.3	Process Connection Type	1/4" NPT (M) ***Adaptor required for BSP to NPT in case if 1/4" BSP(M) is provided**
1.24	Process Connection Accessories	Pig Tail Siphon
1.25	Material of Construction for Accessories	316LSS/316SS/304SS
1.26	**Non-Wetted Part**	Mentioned below
1.26.1	Electrical Housing	316LSS/304SS
1.26.2	Electrical Connection Type	Terminal box
1.26.3	Electrical Cable Entry	1/2" NPT conduit fitting
1.27	Enclosure Protection	IP 65 minimum

The Approved/Suggested Makes: Wika/Keller/Jumo/Baumer/Setra or equivalent

Technical specification: Thermocouple: TC_Spec (N & T Type)

- Lead wire must be Insulated with seal port to avoid ingress of moisture & dust particles.
- IR Value must be > 1000MΩ
- Sheath material should be Inconel.
- MI material either be MgO OR Al_2O_3.
- Thermocouple must be Ungrounded.
- Accuracy should be of Class II.
- Sealed end plug (hygroscopic seal to prevent ingress of moisture inside the thermocouple)
- Length: 1500 mm(max) or as per requirement, final Length will be decided at the time of Process equipment commissioning.
- PDI Test: Insulation resistance test (100 %), physical inspection, Resistance, leak test on a single piece of each type.

The Approved/Suggested OEM/Makes: Tempsens Instruments or equivalent make

Technical Specification of Radar: Radar_Spec:

Sr. No	Specification	Desired
1	System configuration	Non-contact level transmitter with Required Flange and Mounting Accessories

2	Transmitter type	Microwave based RADAR for Continues level Measurement of Liquid in a Closed/Open Vessel
3	RADAR method	Pulsed/FMCW radar.
4	Measuring Range	Up to 10 meters or better
5	Max Temperature in Vessel	Up to 50°C
6	Antenna	Horn/Cone antenna suitable with temperature rating up to 50°C
7	Accuracy	±5mm or better
8	Antenna MoC	SS316L / SS304L
9	Process connection	SS flanged
10	Nozzle opening	100 mm approximately
11	Electronics Unit MoC	Die-cast aluminium with acid resistant paint/Stainless Steel (electropolished/ precision casting)
12	Ingress protection	IP65 or better
13	Power supply	Loop powered, 10-24V DC
14	Output	Two wire, 4–20 mA DC with HART Communication
15	HART Configuration	Fully configurable using standard Hand held HART device Configurable parameters: Span & Zero adjustment within Range, span trim, Zero trim, Current trim and all parameters supported by Standard HART device
16	HART Compatibility	HART compatible device, Must have registered on HART Foundation
17	Fault alarm /Diagnostics	In case of sensor or circuit failure, the self-diagnostics drives the output to up scale Min or Down scale Max current limit As per NAMUR NE43 specification
18	Load resistance	500Ω or better Load driven capability at 24V DC
19	Turn on time	Less than 10s.
20	Output damping	Site programmable 0 – 999s
21	Electrical connection	½" with cable gland for 1 pair cable
22	Radar Operating Frequency	26 GHz technology (Pulse) or suitable frequency(FMCW) for better signal strength
23	Response time	1sec or better
24	Beam angle	10º (TYP), but shall be as minimum as Possible.
25	PDI test	General specification & Performance test, HART Communication test, NAMUR NE43 specification test, all test as per tender specification requirements.

The Approved/Suggested Makess: Vega/ E&H/ ABB/ or Equivalent Make complying with tender specification

Technical Specification: Ultrasonic Flow-Meter: UFM_Spec

Technical Specification of Portable Ultrasonic Flow meter for Water Injection Plants

1. Type of meter: Portable Clamp on Ultrasonic Flow meter
2. Working principle: Transit Time Difference
3. Measurement medium Liquids: Acoustically conductive fluids, including most clean liquids and liquids with limited amounts of solids or gas bubbles
4. Process Pipe Material: All metals pipes.
5. Type of mounting: Clamp On Pipe mounted with Suitable Mounting accessories are to be provided along with each unit.
6. Pipe Size: Suitable for Pipe Size 1" to 10"

7. Pipe wall thickness: 1 mm to 10 mm
8. Velocity (Min/Max): 0.3 m/s to 12 m/s
9. Operating pressure range: 0 - 3 kg/cm2
10. Operating temperature range: around 10 to 60 Deg. C
11.Ambient Temperature exposure: 10 to 50 Deg. C

Overall Meter Specification :-

12. Working principle: Transit Time
13. Installation type: Clamp-on type
14. Accuracy: ±2% of reading or better
15. Repeatability: ±0.5% of reading or better
17. Internal Memory: Required for Data logging
18. Communication: Interface RS 232 or RS485 Modbus with supporting cables
19. Output minimum: one 4-20 mA output (HART compatible device)
20. HART compatibility: HART compatible device, Must have registered on HART Foundation
21. Display: LED / Backlit LCD Alphanumeric Display
(The meter shall be supplied with suitable integral or external display
to indicate all the measured parameters.)
22. Input Power: 110 …. 240 V AC, 50 Hz.
23. Cable Compatible with system as per industry standard, length minimum 5
mtrs
24. No of measuring channels: 02 or more
25. Measurement of :Volumetric flow rate, Velocity, Totalized Flow
physical quantities
27. Flow Sensor/Transducers: Required (Suitable number of Transducer Pairs to be provided to cover given Pipe Line sizes
28. Degree of Protection: Flow Sensor with IP65 or better
29 . Operating Manuals and test/calibration certificates to be provided.
30. Instrument is to be provided with suitable carrycase and clamping fixtures, materials etc.
31. Sensors, Accessories & Documentation: Each Portable Ultrasonic Flow meter should be supplied complete with the followings -
a) All required Sensors to measure flow rates for various
pipe sizes and flow rates as per specifications,
b) Display Unit
c) Thickness measurement probe with display
32. The following accessories are to be supplied as a minimum along
with each Portable Ultrasonic Flow meter :
a) Sensor Mounting accessories suitable for each type of
sensor
b) Transmitter and sensor Carrying Case, Acoustic Coupling
Fluid (sufficient for minimum 100 measurements),
c) Any software packages for analysis, if applicable, to be
supplied in CD/DVD as a free issue item.
d) Connecting cables to PC/Laptop
33. Following documents shall be supplied in hard copy as well as in soft
copy
i) User Manual.
ii) Calibration Certificate traceable to National / International.
34. PDI Test: General specification & Performance test, HART Communication test, all test as per tender specification requirements.

The Approved/Suggested Makes: Siemens/E&H/Fuji/krohne/Electronet or Equivalent Make complying with tender specification

Technical Specification: Needle Valves: NV_Spec

Sr. no.	Specification/Features		Requirement
1.	Body MOC		A479-316/ ASTM A182 or equivalent standard
2.	Panel nut		A479-316/ASTM A182 or equivalent standard
3.	Stem		A479-316/ASTM A182 or equivalent standard
4.	Packing		Teflon/PTFE as per D1710
5.	Washer		A479-316/ASTM A182 or equivalent standard
6.	Gland nut/lock nut/lock pin		A479-316/ASTM A182 or equivalent standard
7.	Grub screw		SS
8.	Handle		SS
9.	Vee tip		A 564-630
10.	Fluid media		Compressed air 1 to 300 Psig, Steam, Water, Air expected etc.
12.	Valve Cv	¼" Size	0.31 (Min)
13.	Pressure Rating		1500 PSI or more as per ASME B 16.34
14.	Temperature Rating		0-260°C as per ASME B 16.34
15.	Pressure drop		Minimum
16.	Direction of flow		bidirectional
17	Flow regulation		should have gradual taper to good regulation (4 rotations minimum for open to close).
18.	Body construction		One piece (no welding) forged body
19.	Valve plug Tip design		Non rotating vee shape type design to prevent scoring and galling
20.	Finish		Mirror finish furnished to 16 RMS
21.	MCC, heat code traceability, make model, size, working pressure engraving		To be engraved on the valves body
22.	Leakage class		Class- VI, pressure bubble tight.
23.	Make/Model		Panam/Astec/Parker/Swagelok/Havi Fittings & Valves/Seal Excel
24.	Testing		Hydrostatically tested as per MSS-SP-99,Test also with Nitrogen gas at 100 PSI for seat, shell, body leakage.
25.	¼" NPT (F) X ¼" NPT (F) NEEDLE VALVE		Quantity: 25 Nos.
26	PDI Test		General specification & Performance test, Leakage test, Pressure rating test, physical inspection, all test as per tender specification requirements

Technical Specification: Ball Valves: BV_Spec

Sr. no.	Specification/Features	Requirement

1	Body MOC	A479-316 SS/ASTM A182 or equivalent standard
2	Panel nut	A479-316 SS/ASTM A182 or equivalent standard
3	Stem	A479-SS316 (MOC) with anti blow-out protection
4	Packing	Teflon/PTFE as per D1710
5	Washer	SS316
6	Gland nut/lock nut/lock pin	SS316
7	Handle	SS Handle With Nylon/Plastic Sleeved for Protection/grip (Quarter turn Handle with stop)
8	Ball	SS 316, Super finish Ball for effective sealing
9	Ball Valve type	Floating Ball type
10	Pressure Rating	1500 PSI or more as per ASME B 16.34
11	Pressure drop	Minimum
12	Direction of flow	bidirectional
13	Body construction	One piece (no welding) forged body
14	MCC,heat code traceability, make model, size, working pressure engraving	To be engraved on the valves body
15	Leakage class	Class- VI, pressure bubble tight.
16	Make/Model	Panam/Astec/Parker/Swagelok/Havi Fittings & Valves/Seal excel
17	Testing	Hydrostatically tested as per MSS-SP-99,Test also with Nitrogen gas at 1000 PSI for seat,shell,body leakage.
18	PDI Test	General specification & Performance test, Leakage test, Pressure rating test, physical inspection, all test as per tender specification requirements

Quality assurance: OEM of the Needle & Ball Valve should have, ISO 9001:2008, PED 97/23/EC approved Procedure for Quality assurance of the final product .OEM should be ISO -9001 certified company. A copy of all the ISO & PED certificate shall be submitted with offer.

The approved/suggested Makes (Needle & Ball Valve): SealExcel\astec\panam\Havi Fittings & Valves\Swagelok\Parker or Equitant Make Complying with tender Specification

Technical specification of Header: PGD_Spec:

Fabrication of SS make (Size: $1^1/_2$" Dia) Air Header:

Air Line connection for all DP transmitter Purging line to be Provided from Air Header. Air Header will be installed in Transmitter Rack or wherever required, and for air supply connection for AOBV valve and ventilation damper. All Air Header will have welded Nipple connection of 1/4" (08-10 (min as per requirements)) Nos for process tubing + 01 no for Drain), MOC of Header: SS304L, Schedule- 40 Pipe.
Quantity: 10 Nos.
Air Header Fabrication Drawing will be provided to successful bidder.

Technical Specification: Cable Trays: CBT_Spec:

Material: MS GI coated
Type: Perforated Holes
Width: (300 mm, 100 mm,150 mm) as per C&I_BOQ

Accessories: Bridge, C-channel, Coupler plates of required length as per Installation & commissioning requirements**.**

Finished trays shall be free from burrs and sharp edges

Technical Specification of 3/2 way Solenoid Valve: SV_Spec

Sr. No	Specification	Required specification	Compliance
1	Type	3/2 way, Normally closed	
2	End Connection	¼" NPT (F)	
3	Coil Excitation voltage	48V AC	
4	Pick up & Drop down voltage	Pick up Voltage : 60 to 70% of Nominal Voltage,Drop Down Voltage :< 20%	
5	Media	Wet & Dry Air	
6	Media Temperature	15 70Deg C	
7	Operating Pressure	Upto 10 bar	
8	Orifice size	4 - 5 mm	
9	Body (MOC)	SS316/304	
10	Seat Material	Viton/PTFE	
11	Coil Insulation	Class F	
12	No of coil	01 coil	
13	Enclosure	IP 65 minimum	
14	Seating	Soft seating	
15	PDI Test	General specification & Performance test, Operating Pressure rating test, physical inspection, all test as per tender specification requirements	

The Approved/Suggested Makes for SV: Rotex/ Fluidtech or Equivalent Make complying with tender specification

Technical Specification: Pressure Gauges: PG_Spec:

Accuracy including repeatability : +/- 1% F.S.D.
Range : 0 -10 Kg/CM2
Resolution : 1% of F.S.D.
Over range protection : 1.5 times F.S.D.
Dial size : 100 mm
Pointer : Knife edge type
Zero adjustment : Micrometer adjustment.
Window : Shatter proof glass.
Blow out disc : To be provided.
Mounting : Field Mounted
Process connection : 8 NB screwed (male) NPT, bottom connection
Housing : Dust and weather proof cast Aluminium with black stove enameled paint.
Ambient conditions : $(16 – 45)^0$C at 95% RH.

Material of Construction

Wetted metal parts	SS 316.
Movement	SS 316
Housing	Cast aluminium with black stove enameled paint.
PDI Test	Performance test, proof pressure test

Technical specification of PRV: PRV_Spec

1. Process fluid : Air

2. Upstream pressure range : 7 Kg/cm^2

3. Downstream pressure range : 0 - 5 Kg/cm^2

4. Temperature : 30^0C

Filter and Regulator

1. Type : Constant relieving type

2. Regulating characteristics : With the down stream pressure set at maximum and flow at 10% when the input has changed from 7 Kg/cm^2 to 4 Kg/cm^2, maximum allowed drop is down stream pressure is 5 %.

3. Flow characteristics : Maximum allowable pressure drop is 5 % of set pressure when flow varies from 10% to 100 %.

4. No. of output ports : Two (including one for pressure gauge)

5. Output gauge : 50 mm diameter gauge marked in Kg/cm^2 with metal casing

6. End connection : NPT(F) screwed connections

7. Filter element : 5 micron ceramic

8. Diaphragm material : Buna N

9. Valve seal and plug material : Stainless steel

10. Bowl material : Moulded transparent polycarbonate

11. Body material : Aluminium (Anodized surface preferably)

12. Mounting : with help of Brackets

13. PDI test : Performance test, Pressure regulating test

Technical Specification for Magnahlic gauges: MG_Spec

Type: Magnehelic Differential Pressure gauges
Measurement type: Capable of indicating positive, negative, or differential
Accuracy: +/- 3 % or better
Range: Configurable in range of 0 - 500 mmWC or equivalent range
Dial size: 4” Minimum
Housing Material: Die cast aluminum
Process Connection: 1/8” NPT(F) high & low pressure taps.

The Approved/Suggested Makes: Dwyer or equivalent make

Technical Specification for Purge Rotameters with DP regulator: Rota_Spec

Type of Measurement gauge: Positive, Negative or Differential Pressure Measurement

Service: Air and non-combustible, compatible gases.

Accuracy including repeatability	:	+/- ±2% of FS Range, throughout the range at standard temperature condition.
Range:	:	- 5" to 5" of Pressure (negative, Positive, Differential Pressure)
Resolution	:	1% of F.S.D.
Over range protection	:	1.5 times F.S.D.
Dial size	:	100 mm
Pointer	:	Knife edge type
Zero adjustment	:	Micrometer adjustment.
Window	:	Shatter proof glass.
Blow out disc	:	To be provided.
Mounting	:	Field Mounted
Process connection	:	8 NB screwed (male) NPT, bottom connection
Housing	:	Dust and weather proof cast Aluminium with black stove enameled paint.
Ambient conditions	:	$(16 – 45)^0$C at 95% RH.
PDI Test	:	Performance test, Over range test(pressure)

Material of Construction

Wetted metal parts	SS 316.
Movement	SS 316
Housing	Cast aluminium with black stove enameled paint.

2C). Specifications for purge rotameter with integral flow controller & Needle valve.

End Use : For purging air at constant flow rate in closed tank level measurement system (irrespective of variation in level) by Purge (bubbler) method.

Process condition

Fluid : Air

Operating Temp. : 25 to 35 Deg °c

Operating Pressure : 1.4 Kg/Cm2 (g)

Maximum Pressure : 7 Kg/Cm2 (g)

Range : 6 to 60 NLPH or the nearest range of scale.

Rangebility : 10 or better

Minimum Resolution : 2.5 LPH or better.

Overall accuracy : +/- 5 % of FSR or better

Scale : Directly engraved on tube or by separately attached engraved aluminium scale.

Needle Valve : Integral with Rotameter at inlet/outlet.

Needle Valve Flow Metering (Minimum): Precise control of flow through out the range, at least 0 -2& half turn for metering of flow for 0 -80% range of rotameter with precision is acceptable.

Needle valve specification without acceptable Precision control as per minimum requirement , will get rejected.

All Needle valve Operation shall be Prone to system vibration, if any provision for locking of needle valve rotation to avoid unintentional throttling of flow, can be Provided, it will be The approved/suggested. Number of turns to be mentioned by tenderer.(Not be less than 5. Higher will be The approved/suggested).

Mounting : Mounting from Bottom/Top on Angle & Flush panel mounting with bezel, Mounting accessories to be provided.

Materials of Construction:
Tube Material : Borosilicate Glass
Float material : SS 316/ SS 304 /Glass

End fitting : SS 316/ SS 304
Packing Material : Teflon with externally adjustable packing gland.

Body Material : SS 316/ SS 304
Needle Valve Material : SS 316/SS 304

Flow Controller/DP Regulator in Rotameter: DP Regulator integral to Rotameter body at input /Output port for Upstream/Downstream Pressure Regulation:

Upstream Pressure : 1. 4 Kg/Cm2 (g)
DP variation : 0 mm - 4000 mm of water column.
Flow Regulation : +/- 5 % of set flow or better

Body Material : SS 316/ SS 304
Material of diaphragm : Teflon.
Material of spring and trim : SS-316/SS-304

Process Connection : Inlet End: 1/4" NPT (F) at rear connection
Outlet End: 1/4" NPT (F) at rear/Top connection

Calibration : Each rotameter should be calibrated along with the flow controller with air, at 1.4 Kg/cm2 (g) and 30oC at inlet.

PDI Test: Performance test, Rotameter calibration test, Dp regulator performance test, Needle valve Performance test, Maximum Pressure rating test, all test as per tender specification requirements.

The Approved/Suggested Makes for Purge rotameters: IEPL/ Spink control or equivalent Make

Tender Specification of Load Cell with Transmitter & Local Display Unit: LDC_Spec

Measuring range: 0 -500 kg
Sensitivity: 2mv/v or better
Operating Temperature Range: 0 -50 Deg C
Excitation voltage: 5 VDC (Regulated voltage supply)
Load cell Circuit: Full Bridge strain gauges(04 Nos), Temperature compensated.
Load cell Type: Bending Beam/shear beam load cell mounted on SS make platform for industrial application of material weighing (customizable as per User requirements)
Remote O/P
1. Analog O/P: 4 -20 mA O/P for remote Display
2. Modbus Serial O/P
Accuracy: +/- 0.3% or better
Minimum Bridge Resistance: 85Ω (4 off 350Ω Sensors in Parallel).
Display: 6 Digit Red / Green ”Seven Segment LED".
Thermal Drift: < 100ppm/°C.
Power Supply: 230V, 50Hz AC Mains OR 110V, 50Hz Mains.
Relay Contact (Alarm configurable): 2 Nos. 5A, 230V/50Hz Resistive Load.
Other features: Option for tare, calibration (buttons on front screen of Display/Panel Meter for Weight Tare and Load Cell Calibration)
Accessories: Connecting cables, connectors

C.1B.1: Bill of Quantity (BOQ) for work of “Detailed Engineering work, Fabrication, supply, Installation, commissioning, Interfacing & testing, of Data Acquisition & control System (DACS), with required accessories, Hardware, mounting structures, etc”

BOQ_DACS BOQ for Fabrication, Supply, Installation & testing work for Data acquisition & control system system.

Sr. no.	Description of Item	Brief Specification	Quantity	Unit	Item no. as Per NIT Schedule- A (To be covered in NIT Schedule- A, item)
01	PLC system	PLC system(I/O channels as Mentioned) AI: 128 nos (Differential Ended), AO: 16 Nos., DI: 160 Nos., DO: 160 Nos. Refer: PLC_specification	01	Set	Item Sr. No 14 of Schedule- A (fabrication supply, detailed engineering of PLC based Data Monitoring & Control System)
02	PLC panel	Refer PLC_panel_spec	01	No.	
03	PLC spares	Refer PLC_specification	01	Set	
04	PLC Programming Software with License	Refer PLC_specification	01	No.	
05	Power Supply(SMPS) PLC system	Refer PLC_specification	08	Nos.	
06	Miniature Slim relay , 24 VDC,	Miniature Slim relay , 24 VDC, NO/NC change over contact, (5Amp) ratting. Refer DO_Relay_spec	200	Nos.	
07	Fuse Tbs with indication	Refer PLC_spec	01 (As Per Specification)	Set	
08	Alarm Annunciator Panel	Refer Alarm_Spec	02	Nos.	
08	SCADA (server cum control client) 2500 tag License (min)	Refer: PLC_Spec	02	Nos.	Item Sr. No 15 of Schedule- A (fabrication supply, detailed engineering of SCADA System for Process Control)
09	SCADA Web Control Client Lic: 1500 Tag Min	Refer: PLC_Spec	03	Nos.	
10	Desktop PC I5/i7 Min 4 core, 16 GB RAM, 1TB Hard Disk	Refer PC_Spec	03	Nos.	
11	OPC Tunneller cum Modbus OPC server License	Refer: PLC_Spec	02	Nos.	
12	SCADA Operating Panel	Refer OCS_Panel_Spec	01	No.	
13	Network switch Managed	Refer: NSwitch_Spec	03	Nos.	Item Sr. No 16 of Schedule- A (Supply, detailed engineering of Networking System)
14	POE Network Switches Managed	Refer: NSwitch_Spec	04 .	Nos.	
14	Network I/O box(Ethernet)	Refer: NSwitch_Spec	50	Nos.	
15	LIU (fiber optic cable)12 core	Refer FBOC_Spec	04 Nos.		
16	Cat 6/6a Cable	Refer Cat6_cab_spec1	2500		
17	Cat6 Armoured cable	Refer Cat6_cab_spec2	1000		
18	Fiber Optic cable(12 core)	Refer FBOC_Spec	500 Mtrs		
17	Patch cord (fiber optic, 3 Mtrs)SC-LC	Refer FBOC_Spec	15 Nos.		
18	Patch cord (fiber optic, 3 Mtrs) SC-SC	Refer FBOC_Spec	10 nos.		
19	Patch cord(fiber optic, 10 Mtrs)	Refer FBOC_Spec	03 Nos.		
20	SFP port (FO, Bidirectional	Refer FBOC_Spec	10 nos.		

	Bidi convertor on single core)				
21	Accessories & Required Hardware for Installation & Commissioning of PLC & SCADA System	As per Requirements	01(As per Specification)	Set	Item Sr. No 24 of Schedule- A (Installation & Commissioning of whole system with required Accessories, Hardware, Support Structures)
22	Installation, Commissioning & Testing of PLC, SCADA based DACS system	As per Requirements	01(As per Specification)	Set	
25	Installation, Commissioning & testing of Network Switches	As per Requirements	01	Job	
24	Laying of Network Cables, FOC in Tray, wall with saddling work		01	Job	Item Sr. No 21 of Schedule- A (Cable laying work with required accessories and Hardware

C.1B.2: Detailed Technical specification for All Supply Items and Scope of Installation & testing Mentioned in BOQ_DACS

Specification for PLC & SCADA System:

Overview

1. **Programmable Logic Controllers (PLCs)** 01 Nos.
2. **SCADA System with PCs (Server cum Client)** 02 Nos. (5000 Tag License)
3. **PLC Panel Cabinet Cum Marshalling Panel** 01 Nos.

(iii) Total Input/ Outputs (I/O)

I/O Type	Quantity
Digital Inputs (DI)	160
Digital Outputs (DO)	160
Analog I/P	128
Analog O/P	16
SCADA Server Cum Control Client with License (5000 Tags Minimum)	02
OPC Tunneler cum OPC communication Server License	02

System Architecture

a) The system shall have a PLC based Data Acquisition and Control System with operator interface provided through SCADA HMI for monitoring and control.

b) The PLC shall contain all the interlocks and closed loops while the OCS shall have necessary hardware and SCADA software to monitor and control any part of the plant.

c) PLC Programming Software shall also be supplied to carry out PLC Configuration.

d) The quoted system should have a proven track record.

e) The quotation should have break up for PLC CPU Module, Termination Rack, I/O Modules, GUI Software, Application Programming etc.

f) The supplier should quote **one spare module** each for CPU, AI, AO, DI & DO, Power Supply Module, Ethernet Communication Module, Backplane etc. If communication module is a separate module, then spare of the same shall also be quoted.

1. General

The PLC should have a flexible and modular architecture consisting of independent units and having its own rack redundant power supplies. PLC should run independently once programmed.

It should be possible to operate any part of the plant from any of the OCS cum Server i.e., the PLC and OCSs should be connected in a bus architecture and it should be possible for any OCS to communicate with PLC.

The raw materials and any bought out parts required for the fulfillment of this specification shall be of high quality traceable to National / International Standards. Manufacturing Processes and workmanship shall be traceable to the state of art practices. All electronic components, active and passive, and any bought out electronic/electrical sub-assemblies shall be quality assessed and conform to relevant National/International standards.

The software and hardware should have provision to add OCS and PLC in future upgradation.

1.1 The power supply to the PLC shall be ***ON RACK redundant power supply module of 24V DC*** (Output) ± 4.5%, Power supply Input (100V to 240V AC), 50Hz ± 3 HZ.

The various D.C. levels (such as 5V/15V/24V DC) required within PLC/RTU shall be generated/supplied in the system and not in the scope of purchaser. The scope of supplier includes 24V DC power supply for analog inputs and 24V DC power supply for relays of digital outputs. The power supplies required to operate various loads switched through digital outputs is in purchaser's scope. The failure of power supply shall be indicated either by LED or MMI. Each PLC/Marshalling Panel shall have 24V DC and 240V AC Power Indication LED or MMI. ***The 24V DC supplies should be of sufficient capacity such that in case of failure of one 24V DC supply, the other one shall be able to drive the entire load without affecting the system.***

1.2 Operating Conditions

The system shall be rated for ambient temperature variation between 5 to 50°C and relative humidity up to 95% non-condensing.

1.3 Surge Voltage:

Surge withstanding capability shall be as per IEEE standard 801-2.

2. Programmable Logic Controller (PLC)

a) The PLC shall scan all I/O, execute interlocks and closed loops, send all data to OCS and accept commands from OCSs.

b) It shall have good diagnostic features so that it can report any failure of any I/O channel/ module to OCS.

c) The PLC shall have all necessary hardware and software including CPU module local memory, I/O cards etc., to execute above functions. The PLC should run independently once programmed. The program must reside in EEPROM/Flash EPROM of CPU.

d) The PLC shall have plug in type easily removable/replaceable Input/Output modules and CPU module (and communication module if necessary). It should be possible to remove and replace any I/O card while the system is running, they should be **Hot Swappable**.

e) Offered PLC system shall be modular in construction and shall offer Solid-state microprocessor-based Rack Mounted Controller with floating point processing capability. Din Rail Mounted System shall not be acceptable. The Controller shall be 32-Bit and with minimum 4 MB onboard memory. The processors must have an internal non-volatile memory to store application and data. Processor must also have a reserved slot for a removable cartridge so that the application and data backup can also be resident on a removable component.

f) The range must provide processors with at least 3 built – in Ethernet ports featuring a web server complaint with various operating systems: minimum is Windows, IOS. Also, CPU has on board USB Port for performing the maintenance operation.

g) No battery supply shall be required for non-volatile backup of the controller application.

h) The CPU module shall have dual core or equivalent Bus bar architecture to support Multitasking and Parallel Execution support. It shall be a high-speed processor with fewer transistors to provide high speed capabilities. The CPU shall have highest environmental robustness.

i) The hardware and software design of the system shall govern the basis criteria like Fail Safe Design, System Availability, Modular Expandability, User Friendliness and Exhaustive Fault Monitoring and Diagnostic Capability.

j) It shall comply for general requirements, regarding service conditions, mechanical constructions etc. as per IEC draft standard**.**

Quotation shall be provided with module wise cost instead of a wholesome cost figure.

k) All field I/O shall be terminated in marshalling panel. All the wiring termination from PLC I/O modules in PLC rack/panel to marshalling panel after panel installation shall be done at purchaser's site by supplier.

l) IO Cards and Processor shall be of same family.

m) It shall be possible to replace I/O modules on line without influencing other control functions than that covered by I/O modules being replaced.

n) Addition or deletion of IO modules or racks in the application programme shall be possible without switching Off / stopping the controller / IO rack as well as changing the application or variables

o) There must be a locating device for the modules, and automatic checking of conformity with the system software configuration to ensure that errors are avoided during module replacement.

p) All modules shall have a display block for identifying module and channel faults: input, output, bus device, axis, etc. These diagnostics are performed without using any special tools

q) The modules shall be fully configurable by setting parameters in the development and runtime software. The parameters shall be stored in the PLC application and shall be automatically reloaded by the CPU if a module is exchanged.

r) The PLC system shall have inbuilt support for remote I/O exchanges on ethernet TCP/IP or shall be supported on external communication ethernet based Module.

s) All I/O modules shall have on card LED indication for status of each I/O in addition to fault indication. All the I/O modules, CPU and power supply modules shall have pilot type of LED indicator to show their status.

t) Digital inputs and outputs shall comply with the requirements of the standard voltage rating.

u) All cards shall be suitable for rack mounting either in system cabinet or suppliers' special cabinet. All the cards shall be of plug-in type for easy removal or insertion.

v) I/O modules should be connected to CPU through I/O bus.

w) The communication between PLC and OCS should have bus structure and preferably: Industrial Ethernet.

x) The PCB of all modules including processor, communication Module, power supply and input/output modules shall be conformal coated as per Standard ISA 71.04 / IEC 60721-3-3 on their PCBs (certified by OEM) as a minimum means of protection.

y) The controller simulator shall come as the standard software package, it should be included in the standard software.

z) Offered power supply module shall have the diagnostics available via network for temperature sensing, uptime duration etc.

aa) Offered controller shall be IEC 62443 certified for cyber security.

bb) Detailed specification of CPU and I/O modules is given in **Annexure 1.**

cc) PLC cabinet and marshalling panel specification is given in **Annexure 3.**

dd) The PLC must support **MBNET** (Modbus on TCP/IP) and **MODBUS.**

Applicable Standards and Codes

Latest edition of the following codes and standards shall be applicable. In the event of any conflict between any requirement in this specification and that of the applicable codes and standards, the governing requirement shall be the more stringent of the two at the discretion of the purchaser.

IEC-61131-2 Programmable controllers - Part 2: Equipment requirements and tests
ISA RP 55.1 -1975 HARDWARE TESTING OF DIGITAL PROCESS COMPUTERS
IEC-61131-3 Standard for Programming controller programming Languages
ISA S5.1 Instrumentation Symbols and Identification

(iv) OCS/Server

a) Servers/OCSs shall have necessary hardware and software to work independently and to monitor and control the entire plant.

b) OCS shall be suitable for monitoring and control. There should be provision for disabling control functions, if required.

c) The operating system in OCS shall be LINUX/Windows 10/Windows 11, it should be best compatible to SCADA Software.

d) The detailed specification of OCS and programming PC is given in **Annexure 2.**

m. Software

The supplier shall supply licensed version of both **PLC Programming and SCADA GUI Software.**

5.1 PLC Programming Software

a) The programming software shall be based on ladder diagram (LD) or Function Block diagram (FBD).

b) In the programming software, provision shall be there to add/delete/modify I/O modules, channels, PLCs etc. Also, it should be possible to perform all the Boolean Operations such as AND, OR, NOT, XOR etc. and timer/counter functions with Digital I/O and flags. Also, it should be possible to have PID, all arithmetical operations (Addition, subtraction etc.), multipoint linearization, square root extraction, high/low selector, comparator etc. with analog I/O.

c) If required, programming software shall be given with connecting cables and communication cards for programming of PLC.

d) The programming software as well as CPU memory shall support for at least 1000 interlocks with each interlock having three conditions on an average, 256 analog I/O read/write programming Instructions and 30 PID closed loops and have sufficient memory to Read/write 256 Analog Inputs/Outputs from external devices using Ethernet TCP/IP (External I/O scanning) for each PLC.

e) It shall be possible to program cascade and profile control in case of PID loops. Also, it shall be possible to change the set point and parameters like Kp, Ti and Td on line from OCS.

n. Graphic User Interface (GUI)/ SCADA software

a) The SCADA software shall support MODBUS on TCP/IP and MODBUS RTU protocols.

b) The software license shall be for 5000 tags.

c) The SCADA software shall support OLE for Process Control (OPC).
OFS OPC Server or equivalent server client license with ***OPC tunneller software compatible to SCADA*** *shall be supplied along with the system.* ***(02 Nos. Licenses)***

d) The GUI /SCADA software to be loaded on both the OCS shall have license for monitoring, control & Configuration/development.

e) The SCADA software shall also communicate with other MODBUS/MBNET devices (SCADA Software I/O driver should have protocol support for any basic Modbus RTU and Modbus TCP/IP supporting Devices).

f) The GUI/SCADA software shall have all the standard features such as Dynamic MMI, Alarm annunciation, Report Generation, Current and Historic trend (Graph), ODBC supports and connectivity to standard RDBMS, Oracle and Microsoft SQL etc. It should be possible to add/delete/modify MMI, Alarms, Reports, Trends (Graphs) by an authorized user.

g) It shall have minimum of 4 levels of password for access control so that configurations of the above features can be disabled/enabled depending on password level. There should be provision for supervisor who can add/delete/modify users. Also there should be provision for disabling all the control function.

h) The GUI program shall mask all other programs so that operator will be able to operate only GUI program. Other programs shall be available only to a person with highest level of password.

i) The MMI shall have the objects like Push button, Switch, Slider, Bar graph, Dial etc.

j) It shall have a provision for Software/Hardware error annunciation, related to GUI Software and should have also error debug option for an authorized user for any software/hardware configuration related problems.

k) It shall have possibly a minimum of

- 100 trend frames (historic and current) with at least 8 tags per frame
- 200 Alarm points
- 100 Dynamic MMI screens
- 100 Reports

l) Exhaustive diagnostic features shall be available up to the lowest level with detail reporting on GUI. Appropriate message shall appear; on programming unit if any of the modules in the CPU section or I/O section is missing or not in correct position. Messages for alerting the operator shall be available in the system during switch over to stand by unit.

m) Soft Alarms

Soft Alarms shall be generated i.e. abnormal conditions should be annunciated on the SCADA HMI with a pop-up window and audible sound along with alarm logging.

n) Reporting

The Supplier shall develop and configure reports as per the user's requirements, which shall be based on SQL SERVER 2014/2018 or Express edition or Equivalent, compatible with OS. Client application for report generation and display should be done with SCADA software (using inbuilt ActiveX tools) or has to be provided by third party software such as Crystal Report/Microsoft Report Builder. Supply and Installation of Database and front-end

reporting software, Development of reports, configuration/development of front-end application for reports display and printing is in supplier's scope.

o) **The approved/suggested SCADA Software**
Citect /Plant SCADA from AVEVA. The Citect SCADA The approved/suggested to match the best compatibility of SCADA Server with existing Citect SCADA server installed in Other Plants for Inter communication & centralized data Monitoring Purpose.

o. **Documentation and Training**

Complete documentation for assembling, configuration and programming shall be provided by the supplier. The manuals shall contain all the aspects related to hardware and software.
Training shall be provided for at least two engineers and two supervisors/technicians to gain familiarity with the systems supplied at supplier's premises. The supplier should supply the following documents (**three copies each**) along with the system

(iii) Hardware Manual of DCS/PLC in hard copy.
(iv) Software manual of Programming Software in hard copy.
(v) Software manual of SCADA/HMI software in hard copy.
(vi) PLC I/O allocation details.
(vii) Wiring details / diagrams inside PLC cabinet.
(viii) Printout of FBD/ LD/ST/IL, which is used to develop the application software.

The supplier should supply back up of HMI screen configuration, report configuration, I/O configuration, PLC program etc.

The supplier shall also supply licensed copy software packages such as

m) Installation CDs (licensed version) of GUI/ SCADA/ Software (monitoring, control & configuration)
n) Installation CDs (licensed version Programming software of PLC
o) Installation CDs (licensed version) of operating system.

Also, the supplier should supply licensed version of any other software which is used in installation and commissioning of the system.

(ix) BOQ For PLC and SCADA SYSTEM

Items	Qty.
1. PLC System **Description:** ➢ *PLC system with **DI**-160, **DO**-160, **AI** -128, **AO**-16 Channels. ➢ CPU Module, ***ON RACK*** Power Supply Modules **(24 VDC, Redundant Power Supply)** ➢ **(The approved/suggested Makes: Schneider M580 or equivalent, Schneider Make PLC is Recommended to get the better compatibility and centralized management of PLC programming & configuration and to support Inter communication (Modbus TCP/IP or OPC based) of PLC system with existing Schneider Based PLC systems Installed in other Plants)** ➢ External Ethernet communication Module (**Modbus TCP/IP- 02 Nos.**) & required hardware accessories (including Main Rack, Expansion Rack and Connecting Cables, Memory Card etc.) ➢ Fabrication, Supply & Installation of PLC Cabinet/Terminal Rack ➢ DO Module (Spare) - **01 No.** ➢ DI Module (Spare) - **01 No.** ➢ CPU Module (Spare) - **01 No.** ➢ AI Module (Spare) - **01 No.** ➢ AO Module (Spare) - **01 No.** ➢ Ethernet Communication Module (Spare) NOC/NOE Equivalent, Ethernet,	01 Set

MODBUS TCP Communication Module External - **01 No.** ➢ CPU/IO Rack Power Supply Module - **01 No.** ➢ Backplane for CPU & I/O Rack - **01 No.** ➢ Power Supply Module-24 VDC (Spare) - **04 No.** ➢ PLC Programming Software - **01 No.** ➢ Application Programming ➢ **SCADA Server Cum control Client License* (5000 tags Min) : 02 Nos.** ➢ **OPC Tunnler Software with Modbus OPC Communication Driver with License : 02 Nos.**	

Specification of CPU and I/O Modules

CPU Module

Sr. No.	**Processor type**	**Sequential + Process Control**
1.	Non-Redundant Rack Based PLC	Non-Redundant Rack Based PLC
2.	Power Supply	Redundant Rack Based 24V DC.
3.	I/O Capacity	1024 or more Discrete/Digital I/O 256 or more Analog I/O (All exclusively) Present I/O break-up required is as given overview.
4.	CPU Type	32 Bit Processor with dual core high speed ARM based microprocessor to process both the application on one core and the communications routine, in parallel, on the second core.
5.	User Memory	Flash EPROM/EEPROM/Battery Backed RAM
6.	Programming Memory & Data Memory	4 MB ON board memory and a reserved slot for a removable cartridge so that the application and data backup can also be resident on a removable component. Should be sufficient to have a minimum of 32 PID closed loops, 400 logic gates 100 Timers/Counters, 1024 Words, 2048 Bits etc.
7.	Memory Scan Time	
8.	Battery Back-Up	Offered system shall be battery less
9.	Clock	Real time clock (RTC)
10.	Overall Scanning Time (Total time taken for I/O scan, logic execution, communication etc.)	Should not be more than **100ms** with maximum I/Os configured and programmed consuming 1 MB of PLC memory.
11.	Communications with OCS/ Server	Ethernet IEEE802.3 (Integrated Ethernet Port) with MODBUS TCP/IP.
12.	Communication port	At least 2 Nos of 10/100 base Ethernet port, 1 Nos USB Port
13.	Diagnostic Indication	Processor running, processor or system fault, I/O module fault, download in progress, memory card or CPU flash fault etc. should be provided by LEDs.
14.	Floating Point Math	Shall be available.
15.	Programming Port	It should be possible from OCS/Server through communication port. If programming port is separate,

Sr. No.	**Processor type**	**Sequential + Process Control**
		the supplier should supply all necessary hardware so that it can be programmed from Server or programming PC.
16.	Mounting of CPU	On rack Mounting
17.	Operating temperature	0 to 60 ^{0}C
18.	Storage temperature	-40 to 85 ^{0}C
19.	Humidity	5- 95 % at 55 ^{0}C Non-condensing

DI Module

1.	Type	24V DC (Sinking Type)
2.	Type of Input	Potential Free
3.	No. of Inputs	16/32 Channels/Module
4.	Input Voltage Range	0-30V
5.	Trigger Voltage	12-30V
6.	Input Current	10mA Max
7.	Response Time	10mS Max
8.	Optical Isolation	1500V AC
9.	Status of I/O	By on Board LEDs for each Input
10.	Power-Up & Module/Channel Error Indicator	By LED on Module
11.	Built-In Protection	Against Short Circuit, Over-Voltage, Overload and Reverse Polarity (Inversion)
12.	Failure Condition	OFF (logic 0)
13.	Protective treatment	Conformal coating

DO Module

1.	No. of Outputs per Module	16/32 outputs per module.
2.	Type	Potential free, both NO and NC contacts should be provided. If output modules are not potential free then sourcing type DO should be used and the supplier shall provide relay modules inside the PLC cabinet and wire those with DO modules.
3.	Relay Contact Rating	5A/230V AC
4.	Response Time	15ms Max ON to OFF and OFF to ON
5.	Power-Up and Module/Channel Error Indicator	By LED on Module
6.	Status Indication	Separate LED for each O/P
7.	Isolation	1500V AC for DO Module
8.	Protection	With Fuse
9.	Built-in Protection	Against Short Circuit, Over-Voltage, Overload and Reverse Polarity (Inversion)
10.	Failure Condition	OFF/ De-Energized
11.	Protective treatment	Conformal coating

AI Module

1.	Input type	Current: 4-20 mA DC Voltage: 0-10V, 0-5V, 1-5V DC
2.	Type	Differential ended (sinking), Channels with individual signal ground
3.	No. of channels	**8/16** per module
4.	Resolution	15 bit or better
5.	Accuracy	± 0.4 % (minimum) in overall temperature range or better
6.	Scan time	100 mS max
7.	Input impedance(4-20	250 ohms max.

	mA DC)	
8.	Isolation	300 V DC between channels or better 1000 V DC between channels and ground or better 1000 V DC between channels and bus or better
9.	CMRR	80 dB or more
10.	Reverse polarity protection	Should be provided
11.	Protective treatment	Conformal coating

AO Module

1.	Output range	Current: 4-20 mA DC
2.	Type	Shared output, common ground
3.	No. of channels	4/8 channels/module
4.	Isolation	1000 V DC between channels and ground or better 1000 V DC between channels and bus or better
5.	Scan time	100 mS max
6.	Resolution	15 bit or better
7.	Accuracy	+/- 0.25 % or better
8.	Load driving	600 ohm
9.	CMRR	80dB or more
10.	Failure condition	4mA or less
11.	Protective treatment	Conformal coating

Relay Module

PLC interface, Pluggable Miniature Relay consisting of basic terminal block with push in connection.
Input Voltage - 24V DC (Coil Side)
Contact Side - Single Contact 1-PDT,
Maximum Switching Voltage - 250V AC/DC
Protection: Inbuilt Free wheeling Diode for Transient Protection.

Supply of 230V/24V DC SMPS DC Power Supplies

- DC Output Voltage --- 24V.
- Rated Current (1)--- 10A, Peak Current --- 15A.
- Rated Current (2)--- 40A, Peak Current --- 50A(min)
- Current Range(1) --- 0 to 10A.
- Current Range(2) --- 0 to 40A
-
- Rated Power --- 240W(1) & 960W(2) .
- Ripple & Noise (Max) --- 50mV (Peak to Peak).
- Voltage Adj. Range --- 24V to 28V.
- Voltage Tolerance --- ±1.0%.
- Line Regulation --- ±0.5%.
- Load Regulation --- ±1.0%.
- Input Voltage Range --- 88 to 264V AC.
- Frequency --- 47 to 63Hz.
- Efficiency --- 94% (After 30 Minutes of Burn-In).
- Inrush Current --- 35A/230V.
- Protection (Over Load/Over Voltage/Over Temp) --- Shut down O/P Voltage with auto recovery.
- Working Temperature ---- **-25** to +**70°C**.
- Working Humidity --- 20 to 95% RH, Non-condensing.
- Isolation Resistance --- I/P-O/P, I/P-FG, O/P-FG > 100MegaOhms @ 500V DC.
- Quantity: 08 Nos, as Mentioned Below
- Rated Current (1) for 10 A,240 W: 06 Nos.

- Rated Current (2) for 40 A,960 W: 02 Nos.
- O-Ring diode: Specification as mentioned below
- Contact Ratting: I/P Voltage Range: 12 -30 V DC
- Max O/P reverse Voltage :30Volt
- O/P current ratting: for power supply (1): 2X 10A,1X 20A
- Max I/P current for power supply (1): 2X 20A, 1X40A for short duration of time.
- Max I/P current for power supply (2): 2X 60A, 1X100A for short duration of time
- Insulation Voltage I/P to O/P: 500 Volts
- Protection class: Class 3
- LED indication for redundant power input supply & O/P Power, DI Rail Mounted, Inbuilt Protection circuit
- Transient Protection: Varistor.

PLC Panel & Required Accessories Specification:

(v) Specifications for PLC & SCADA Cabinet

Material used should be free from scratches, dents and other flaws. Welded joints should be nicely ground and finished. Cut-outs should be accurate, neat and without burrs.

PLC Cabinet

PLC cabinet should have sufficient space to accommodate PLC Rack, 24VDC Power supply & 24VDC Power distribution Bus Bar and all power MCB termination. PLC Rack installation is to be done considering future expansion or up-gradation (At least installation space for 2 extra racks should be considered). PLC Interface DO relay module (Pluggable miniature relay Module with basic termination block) Installation and termination will be provided in PLC Panel. PLC cabinet should have provision for I/O termination (open channels for termination should be provided). PLC cabinet should be equipped with cooling fan with filter at front side for proper ventilation.

Dimensions: 1000 mm (W) x 2000 mm (H) x 800 mm (D)

panel should have sufficient space to accommodate wiring, easy maintenance, etc. Sufficient illumination/lighting should be provided. panel will be Tower type PLC panel shall be front glass door (Double door) with Lock should be provided.

The drawing of panel/ termination rack should be got approved by purchaser before fabrication. Cable entry provision should be provided at top and exhaust fan should be provided.

There should be a removable gland plate at top of panels for cable entry provision.

Specification for SCADA Cabinet: A table-Top kind of Cabinet with inbuilt sliding racks for PCs, (02 Nos.), lockable doors, exhaust fans (02 Nos), Air supply inlet louvers with filter, Sliding tray for Keyboard and mouse, wooden top (Sunmika with glass table Top on table top

Dimensions: 1000 mm (W) x 2000 mm (H) x 800 mm (D) (approx., it can be a size of suitable dimensions required for Installation of 02 Nos of SCADA servers PCs with required Hardware & Accessories)

2. Surface Treatment and Painting specification for PLC panel & SCADA panel

All metal parts should be treated by 7 tank process in the following stage

f) Degreasing in either Trichloro-Ethylene or hot Alkaline Solution and then rinsed in Cold Water.
g) Pickling in Dilute Sulfuric Acid at 40-50°C to remove scales and rust and then swilling in cold water.
h) Phosphating in Zinc Phosphate solution at 80-90°C for 15-20 minutes and then swilling in cold water.
i) Passivation in Di-Oxalate solution at 70-80°C and then drying.
j) Spraying with Zinc Chromate Primer within 24 Hr. of passivation, then stoving at 150 - 160°C for 30 minutes
k) Spraying of Synthetic Enamel and stoving at 150- 60°C. Minimum three coats of this paint are required.
l) Primer and synthetic enamel should be from a reputed manufacturer. Shade of the paint should be **Siemen's Grey and finish should be MATT finish.**

All metallic parts of the Termination Rack shall be made of 14 gauge cold rolled closely annealed steel. (CRCA).

3. Wiring

The wiring inside the PLC and Marshalling Panels is in supplier's scope. The supplier has to give the terminal block Nos and provide detail drawing before starting the actual wiring. The wire should be Teflon/PVC insulated standard 1.0 Sq.mm dia. All Power supply wiring should be done with Teflon/PVC insulated standard 1.5 Sq.mm dia. Termination of wires should be done with pin type lug on terminal blocks. Wiring shall be properly routed to ensure free access to all instruments or devices necessary for adequate maintenance services. While wiring Digital outputs, 230 V AC should be segregated and should be located away from other terminals. These terminals should be red in color. Standard Color coding for wiring should be used for segregation of PLC I/Os termination in terminal blocks. Fuse terminal blocks with appropriately rated glass fuses & with Led Indication for fuse unhealthy condition, should be provided for termination of all signals, power supplies. MCB's of appropriate rating shall be provided for power supply isolation and tripping.

Specification for Desktop PC: PC_Spec

Sr. No.	Specification	Requirements	Compliance
	Processor	Intel Core I5/I7, Quad core (min) or better with Intel Virtualization Technology (VT-X) Support. Having Intel Original CPU Cooling Fan & Heat Sink assembly unit.	
	Motherboard	Intel Original Motherboard, H110/B250, with Intel Virtualization Technology (VT-X) Support. Bios Support for VT, **Minimum 2** Memory Slots with 16/32 GB expandability, Built–in-sound , 32Gb Memory Support (Min)	
	Cache Memory	4 MB Smart Cache or better	
	Main Memory	16 GB DDR4 @2133MHz, Expandable upto 32 Gb or better	
	Hard Disk	1TB, SATA @ 7200 RPM	
	Optical Drive	DVD/CD R/W Combo, 16X DVD ROM, 48X CD-R, 32X CD R/W, 48X CD- ROM	
	Graphic Adapter	Intel integrated HD graphic adapter	
	Ethernet Adaptor	Dual port Gigabit Server adapter	
	Cabinet & power supply	Micro tower cabinet with SMPS	
	Keyboard	Easy Access Internet Keyboard with USB port	
	Mouse	optical 2-button scroller mouse with USB port	
	Multimedia	Integrated High Definition Audio: Internal Amplifier	
	Optical Drive	DVD/CD-RW combo, 16X DVD-ROM; 48X CD-R, 32X CDRW, 48X CD-ROM	
	External I/O Ports	6X USB Ports, USB 2.0 Port 4 Nos, USB 3.0 Port 02 Nos, (2 Front , 4 Rear),	

		VGA Monitor Connector, HDMI Connector	
	Operating System	Genuine certification Linux/Windows 10 (64 bit) operating system compatible to SCADA and PLC programming software and Software drivers for Graphics adapter, Ethernet adapter etc.	
	Monitor	HD Graphic Monitor	

Specification for Layer 2 Network Switches: NW_Spec (Managed Network Switch L2, PoE/PoE+ Network Switch(Managed)

The Approved/Suggested Makes: Dlink/ Netgear/cisco/Digisol or equivalent Make

POE Managed Switches: Quantity: 04 Nos.

Non POE Managed switches Quantity: 03 Nos.

Sr. No.	Specification	Requirements	Compliance
01	Type	1. Managed 24-Port 100/1000 BASE-TX Switch with 4 ports Combo 10/100/1000Base-T/SFP, Must have at least 4 slots for Giga fiber connectivity	
02	Security	1. Port security 2. Access control List 3. 802.1X Port based /Mac Address based Access control 4. Traffic segmentation	
03	Layer 2 Features	1. Must support single IP management features, SSH/SSL support 2. Layer 2 features 3. STP, RSTP, Media Redundancy Protocol (optional) 4. 802.3ad Link Aggregation: Static and Dynamic Mode on Uplink and downlink ports for traffic load balance and redundancy. 5. IP-Mac-Port Binding 6. IGMP snooping v1, v2, fast leave. 7. Must support GVRP and 802.1Q VLAN tagging withVLAN groups. 8. Quality of Service: 802.1Ppriority Queues (must support upto 4 Queues) 9. Packet classification based on: TCP/UDP port number, Mac address, IPv4, 802.1p priority, Protocol type, user defined	

		packet content, TOS, DSCP. **10. Multi layer Access control list based on switch port** **Number, TOS, DSCP, Mac Address, Packet protocol type,** **IP Address, TCP/UDP port number, and User defined** **Packet content, IPv4.**	
	VLAN	**a. 802.1Q tagged based VLAN** **b. Q-in-Q tunneling** **c. MAC-based VLAN** **d. Protocol-based VLAN** **e. IP Subnet-based VLAN** **f. Up to 255 VLAN groups, out of 4095 VLAN IDs**	
	MAC Address Table Size	**8K**	
	Switch Fabric	**48 Gbps Forwarding Capacity**	
	Transmission Method	**Store & Forward**	
	Network Protocols & Standards	**IEEE 802.3 Ethernet, 802.3u Fast Ethernet, 802.3x Flow Control**	
	Diagnostic Leds	**Per Unit: Power, Per Port: Activity/Link, Speed**	
	Power Supply Input	**100- 240VAC, 50/60Hz Internal Universal Power**	
	SFP Module	**SFP Modules and connecting patch cords should be supplied along with the network switches as per BOQ**	

Network I/O box(Ethernet); Wall & panel Mounted Ethernet Network I/O box with RJ45 connectors

Material of I/O Box: ABS plastic

Other required accessories: LAN Tester Ethernet cable (01 No.), FOC LAN tester with laser light(visible): (01 No.)

Specifications for Fiber Optic cables, LIU , SFP modules, Patch cords & accessories , etc:
FBOC_Spec: Quantity: As per **BOQ_DACS**

SFP Module: 1000Base-BX (Bidi), data transmission range (10 kms, Minimum) Transreceiver , transmit and receive data on a single fiber core.
Quantity: as per item BOQ

12-port rack mount Light interface Unit
With following specifications

12.6 Must be 19" Rack mountable, 1U size
12.7 Aluminum housing, fully powder coated
vi) Splice trays for pigtail splicing

e) Stackable Cable spools
i. Flame retardant
f. Coupler plates & Blank plates accordingly housed.
(ii) UL approved
(iii) Materials: Aluminium body with epoxy powder coating

(iv) Spool Material: FR Grade ABS
(v) Cable grommets Materials: FR grade Nylon
(vi) Splice tray Materials: Aluminium+ABS

The approved/suggested Makess: Tyco, Systimax, Digi-Link.D-Link or Equivalent make complying with tender specification

Patch cords & accessories
All the fiber optic cable connecting accessories like, pig- tail, couplers, patch cord shall be as per specification ,mentioned below
Suitable for single mode (9/125) fiber, Plastic molded plug type
The approved/suggested by EIA/TIA 568 spec., UL approved.
Types: Different types as per BOQ_DACS
Quantity: As per **BOQ_DACS**

1M). 9U/6U Rack with following minimum specification requirements:
9U/6U Wall Mount Side openable racks with 01 Fans (Minimum),5 Socket PDU, Cable Manager Unit with following specifications:
Powder coated frame
Must be ISO 9001:2000 certified.
Must be single Section, with open able side panel with slam Latch

Specification for Scope of Work of Installation & commissioning of DACS system: Refer B.1B.2: Scope for Installation, commissioning & testing of DACS system with some additional Requirements Mentioned Below

The work of Software application program developments includes:
F.1). PLC programming (ladder/FBD) as per operation and interlocking logic.
F.2). SCADA and HMI programming/ configuration for new and existing SCADA system, (Backup of Existing SCADA application program shall be provided to successful bidder at the time of detailed engineering work of C&I system.
F.3) SACDA development works related to tag database configuration and development of HMI screens of existing DACS
F.4). Network configuration and set up.
There is an existing plant named as TRAP, controlled by PLC (Schneider M340 PLC) & scada (Citect 7.1r2) based DACS system. Successful bidder shall have to develop the new DACS system which will also acquire data from existing PLC of DACS system and incorporate all the HMI graphics, tags,
alarms, reports, trends etc. of existing TRAP plant SCADA application Program in addition to the SCADA application program of New proposed PLC based DACS system, mentioned in this document . The supplier shall configure around 1500 no of Tags of existing devices. Also around 20 no. of HMI screens are to be configured for existing system. Shift / daily reports, trends, soft alarms, etc are also to be configured in addition to HMI screens of New proposed SCADA system.

G).Field device Interfacing: field cable from installed field devices/equipment will be terminated in PLC panel, wiring for interfacing of devices to PLC I/O modules ,All the field devices will be terminated in PLC Panel,
H). Installation: Installation of New PLC & SCADA system is in Supplier's Scope. Installation work includes:
H.1). Shifting of panels to Installation site, Installation of PLC cabinets/panels and their grouting and alignment.
H.2). Installation of PLC hardware, SCADA System, Network switches, LIU Units, Patch panel etc
H.3). PLC communication cabling including between remote I/Os and PLC (data highway cables) and LAN cables shall be run through the HDPE pipe/ PVC conduit where ever required. Supply of HDPE pipe/PVC conduit is also in supplier's scope.
H.4). Installation of software packages including application software.
H.5). Installation of 9U, 6U Racks in field, Installation of Managed switches, LIU units, Patch panel, Interconnecting Patch cords (FOC patch cords, Cat6 Patch Cords)in 9U rack , Local field device L2 managed switches will be Installed in 6U racks with all required Hardware & accessories, Patch Panel. Laying Cat6 cables are covered in section-III. Supply and Laying of FOC cable is not in supplier's scope of work. However termination of Fiber optic cable in LIU nunits and further interfacing upto switches to establish network communication, splicing, OTDR testing all are in supplier scope.
H.6). Other installation as required and as per schedule of quantities in this tender.

H.7) Installation & commissioning of Radiation Monitoring Instrument with all required accessories, all instruments will be wall mounted type. Supply of radiation monitoring instruments with all mounting accessories and mounting clamps are not in supplier's scope (all instruments will be provide at site by BARC, Tarapur at the time of installation), however mounting accessories required for cabling work & termination shall be supplied by supplier only, (approximate quantity of Radiation Monitoring instrument will be 50 Nos.). Details are mentioned in **Section-III A & B**
Supplier/ bidder may visit the site with prior intimation before bidding to understand the scope of work, quantum of work.

I). Commissioning of PLC & SCADA based C&I system: The commission scope of work Includes:
I.1). Commissioning of PLC system.
I.2). Commissioning/ installation of application software.
I.3). Commissioning of Network and LAN.
I.4). Commissioning of SCADA systems.
I.5) Commissioning of field devices with PLC & SCADA system, all field wiring termination work ,PLC interfacing work shall be done by supplier, refer Section-III for details.
I.5). Integrated commissioning of I&C system.

J). Pre dispatch Inspection & Testing: Inspection of all supply items covered in Section 1A&B as per testing criteria mentioned in technical specification in annexure-1 will be done at the site of supplier/ Authorised distributer/system interrogator. Supplier has to bear all the cost of Pre-dispatch inspection. **OEM shall also need to produce the Required Certificates mentioned in technical specification at the time of inspection.**

K). Training on PLC & SCADA system to engineer/technicians at BARC, Tarapur site.

L). Documentation: supplier has to submit Hard copy of System & Network architecture diagrams, field wiring, PLC & Marshalling panel wiring termination, I/O modules interfacing,I/O detailing, documents PLC & SCADA user manuals, PLC application program Hard copies, General Troubleshooting & Maintenance manual of PLC, Tainting Manual & other required reports in triplicate.

M). **Warranty:** The contractor shall provide warranties for all the components, parts, and assemblies supplied and installed, against defects in material and workmanship for a period of at least 12 months (parts and labour), commencing from the date of system acceptance by the purchaser.

N). Maintenance / Service support: The suppliers should ensure that system / instruments offered shall be supported by respective manufacturers for minimum 10 years from the date of commissioning and the systems should not get discontinued support within 10 years. On-site and off-site stock of spares unit / board/modules / components level to be indicated for three years of operations.

C.1C.1: Detailed Engineering work, Fabrication, supply, Installation, commissioning & testing of Different types CCTv System, POE Network switches, 9U Racks, NVR, cat6 & Fiber Optic Cable laying & interfacing with LIU with required accessories, Hardware, mounting structures, Testing and documentation work etc.

The Approved/Suggested Makes for CCTV cameras: CP-Plus/Hikivision/HiFocus/Panasonic/ bosh/Honeywell/ infinova or equivalent

BOQ_CCTv: BOQ for Fabrication, Supply, Installation & testing work CCtv surveillance and Protection system:

Sr. No.	Description of Item	Brief Specification	Quantity	Item no. as Per NIT Schedule- A (To be covered in NIT Schedule- A, item)
01	**Bullet Camera**	IP based Bullet Cameras (2 Mega Pixel, ONVF support)	35 Nos.	Item Sr. No 17 of Schedule- A

		Refer Bcamera_spec		(Supply, detailed engineering of CCtv Surveillance system)
03	**PTZ Camera**	**Wall/Poll mounted IP based PTZ camera** 5 MP resolution,25 X zoom,IP 66 rated or better,Onvif compatible Refer PTZ_spec	04 Nos.	
05	**Network video recorder (NVR)**	32 channel NVR, Support upto 12 MP camera,,Onvif Support, HDD support upto 10 Tb 4 nos each or better. Refer: NVR_Spec	03 Nos.	
06	10/8 Tb surveillance hard disc	Refer: NVR_Spec	06 Nos.	
07	LED TV 55" with HDMI	Refer_ LEDTv_Spec	02 Nos.	
08	Mounting/ support structure for CCTV, Network Rack Installation (as per requirements)		**01 job**	Item Sr. No 24 of Schedule- A (Installation & Commissioning of whole system with required Accessories, Hardware, Support Structures)
11	Installation, Commissioning & testing of Network Switches	Refer: Inst_comm_CCTV	**01 job**	

C.1C.2: Technical specifications for CCTV Surveillance System:

Technical Specification Bullet Camera: Bcamera_Spec.

Sr. No	Specification	Required Specification	Compliance
1	**Video Resolution**	**1920 X 1080 or better**	
2	**Sensor Pixel**	**2 Mega pixel or better**	
3	**Lens type**	**Fixed 4mm/3.6mm/2.8 mm**	
4	**Sensor size**	**1/ 2.8" Progressive Scan CCD / CMOS or better**	
5	**Minimum illumination**	**Colour: 0.18 Lux & B/W: 0.04 or better**	
6	**Day/Night**	**Automatically removable infrared-cut filter**	
7	**Power Source**	**Power over Ethernet (PoE/PoE+) IEEE 802.3af/802.3at and AC/DC**	
8	**Connectivity**	**TCP/IP (Ethernet) RJ45**	
9	**Storage support**	**Edge recording camera shall support 32 GB memory card, Dedicated NAS/iSCSI storage**	
10	**Analytic**	**Motion detection, and support for other analytics**	
11	**IOS**	**Minimum 01 Digital input and 01 digital o/p**	
12	**Security**	**User authentication (ID and PW), Host authentication (MAC address);**	

		IP address filtering, etc	
13	**Casing/Enclouser**	**1p 66 or better**	
14	**Warranty**	**3 Years or More**	
15	**Analytic**	**Motion detection, and support for other analytics**	
16	**Alarm**	**Intruder detection Alarm**	
17	**Accessories**	**Security Brackets, mounting bracket as per field Mounting requirements, vandal proof Housing**	

Specification for PTZ Camera: PTZ_Spec
Wall/Poll mounted IP based PTZ camera, variable focal length with technical specification as mentioned below and with all mounting accessories, cable Protector

Sr. No.	**Specification**	**Required Specification**	**Compliance**
1	**Sensor Pixel**	**2 Mega pixel or better**	
2	**Sensor type**	**CCD/CMOS**	
3	**Sensor size**	**1/2.8" or better**	
4	**Optical Zoom**	**26X or more**	
5	**PAN**	**360° continuous**	
6	**Tilt**	**90° or more**	
7	**Minimum illumination**	**Colour: 0.18 Lux & B/W: 0.04 or better**	
8	**Day/Night**	**Automatically removable infrared-cut filter**	
9	**Power Source**	**Power over Ethernet (PoE) IEEE 802.3af/802.3at and AC/DC**	
10	**Connectivity**	**TCP/IP (Ethernet) RJ45**	
11	**Storage support**	**Edge recording camera shall support 32 GB memory card, Dedicated NAS/iSCSI storage**	
12	**Analytic**	**Motion detection, and support for other analytics**	
13	**IOS**	**Minimum 01 Digital input and 01 digital o/p**	
14	**Enclosure**	**IP66, Vandal Proof;**	
15	**Security**	**User authentication (ID and PW), Host authentication (MAC address); IP address filtering, etc**	
16	**Warranty**	**3 Years or More**	
17	**Accessories**	**Security Brackets, mounting bracket as per field Mounting requirements, vandal proof Housing**	

Technical Specification of NVR: NVR_Spec

The Approved/Suggested Makes for NVR: HikVision/CP Plus/Honeywell/ /Panasonic/Infinova/bosch/ or equivalent

Sr. No	Specification	Required Specification	
1	Operating system	Embedded Linux system	
2	Multiplexor function	Simultaneous live, recording and playback	
3	Power supply	Redundant power supply option (100 to 240 voltage range)	
4	Video inputs	32 channel over Ethernet (IP video Inputs)	
5	User Interface	Support 16-bit true color graphical menu interface and mouse operation prevent reverse rotation once mechanism moved 30deg from its rest position.	
6	Storage and Backup	Storage Method: HDD, Network	
		HDD redundancy: yes Raid 1	
		HDD required: 8/10 TB, 02 nos HDD with each NVR	
		Backup Mode: Network backup, USB HDD, USB writer, SATA writer	
7	Interface	Video input: RJ45, Ethernet IP	
		Video o/p: 1 channel VGA output, 1 channel HDMI output (minimum)	
		PTZ Control: 1 RS485, support different kinds of PTZ protocols	
		Usb Ports: USB 2.0 port for mouse, backup, DVD burning and upgrading	
		HDD Interface: 1 SATA, max 16TB	
8	Video	Video standard: PAL	
		CCTV resolution support: upto 12 MP	
		Display Quality: Monitor: D1 & VGA & HDMI: HD	
		Motion detection: Required	
		Video Resolution support: 1920× 1080, 1280× 1024, 1280× 720, 1024× 768	
9	Audio and video compression support	yes	
10	Alarm Output (minimum)	4ch, NO/NC programmable, green terminal interface	
11	Record and Playback	Record Mode: Manual /Alarm/ motion detection/Timing/Schedule/Stop	
		Search Mode: Time / Calendar / Event / Channel search	
		Playback: play, pause, stop, rewind, fast forward, fast rewind, next camera, previous camera, digital zoom, full screen	

12	**Protocol support**	**HTTP, TCP/IP, IPv4/IPv6, UPNP, RTSP, UDP, SMTP, NTP, DHCP, DNS, IP Filter, PPPOE, DDNS, FTP, Alarm Server, IP Search**	
13	**ONVIF Compliance**	**ONVIF profile G/S support, Compliant to ONVIF 2.0 or latest Version**	
14	**Operating Temperature**	**0°C to 55°C**	
15	**Certification**	**CE, FCC, C-Tick**	
16	**CCTV & NVR management and Configuration software**	**Required, Shall be supplied with NVR system, GUI and configuration software for monitoring and controlling ,software shall support, windows os/ linux os.**	
17	**Accessories**	**Cables required for Configuration, 2U NVR/DVR Rack (03 Nos.)**	

Specification of LED TVs: LEDTv-Spec: LED TV 55" with HDMI, Full HD, USB ports, VGA to HDMI convertor & cable, OS: Non android, Provision to disable/uninstallation of unwanted Apps.

Installation & Commissioning of CCTV Surveillance System: Inst_comm_CCTV: Installation & commissioning of CCTV based Surveillance system **As per** SCOPE of Installation, commissioning & testing for CCTv system mentioned in Part –B.

C.1D.1: Detailed Engineering work, Fabrication, supply, Installation, commissioning & testing of Different types Fire Alarm Sensors, Manual call points, Beam detectors, FAS monitoring & control panel, Repeater panels, Hooters, Linear heat sensing cables with required accessories, Hardware, mounting structures, Testing and documentation work etc.

BOQ_FAS: BOQ for Fabrication, Supply, Installation & testing work for Fire Alarm system with all required accessories and Hardware (**Item no. as Per NIT Schedule- A (To be covered in NIT Schedule- A Item No. 18)**

Schedule- A, item)

Sr. No.	Description of Item	Brief Specification	Quantity	Unit
1.	Morley –IAS by Honeywell Make Addressable Fire Alarm System control panel –ZX2se	Morley –IAS by Honeywell Make Addressable Fire Alarm System control panel –ZX2se	1	No
2.	Morley-IAS make Loop Card ,part No : 795-072-100	Morley-IAS make Loop Card ,part No : 795-072-100	1	No
3.	Morley-IAS make RS-485 communication card, part No: 795-004-001	Morley-IAS make RS-485 communication card, part No: 795-004-001	1	No
4.	12 V ,7Ah Rechargeable SMF battery	12 V ,7Ah Rechargeable SMF battery	2	No
5.	Active Repeater annunciation Panel Morley-IAS by Honeywell, ZXr-A Part No: 709-601-001	Active Repeater annunciation Panel Morley-IAS by Honeywell, ZXr-A Part No: 709-601-001	1	No
6.	Morley-IAS by Honeywell make Multi Sensor Detector, Model No: HM-PTSE	Morley-IAS by Honeywell make Multi Sensor Detector, Model No: HM-PTSE	35	No
7.	Base for Multi sensor Detector,	Base for Multi sensor Detector,	40	No

	Model No: B501-AP	Model No: B501-AP		
8.	MS Metal square back boxes for detector compatible with detector base B501-AP	MS Metal square back boxes for detector compatible with detector base B501-AP	40	No
9.	Honeywell make Addressable Beam Detector Model No: MI-LPB2-S21 with surface Mounting BOX (Model No : Beam –SMK) and reflector (model: BEAMLRK)	Honeywell make Addressable Beam Detector Model No: MI-LPB2-S21 with surface Mounting BOX (Model No : Beam –SMK) and reflector (model: BEAMLRK)	7	No
10	Honeywell make Addressable Hooter, Model No: WSO-PR-N05	Honeywell make Addressable Hooter, Model No: WSO-PR-N05	5	No
11	Morley-IAS make Manual Call Point Model No: HM/MCP/GLASS along with Mounting Back box	Morley-IAS make Manual Call Point Model No: HM/MCP/GLASS along with Mounting Back box	10	No
12	System Sensor make LHS Cable ,Model No: SS-LD-68	System Sensor make LHS Cable ,Model No: SS-LD-68	400	No
13	LHS Cable PC Modulator Box, model: 887/M	LHS Cable PC Modulator Box, model: 887/M	5	No
14	LHS Cable EOL Box ,model: 887	LHS Cable EOL Box ,model: 887	5	No
15	Morley-IAS by Honeywell make Addressable Monitor Module, model No: MI-DMMIE.	Morley-IAS by Honeywell make Addressable Monitor Module, model No: MI-DMMIE.	5	No
16	Standard Mounting Box Model No: M200-SMB or Suitable mounting back for MI-DMMIE module.	Standard Mounting Box Model No: M200-SMB or Suitable mounting back for MI-DMMIE module.	5	No
17	2 Core × 1.5 Sq.mm Stranded Tinned Copper Conductor, PVC insulated armoured FRLS Cable	2 Core × 1.5 Sq.mm Stranded Tinned Copper Conductor, PVC insulated armoured FRLS Cable	700	No
18	4 Core × 1.5 Sq.mm Stranded Tinned Copper Conductor , PVC insulated armoured FRLS Cable	4 Core × 1.5 Sq.mm Stranded Tinned Copper Conductor , PVC insulated armoured FRLS Cable	100	No
19	RS-485 to TCP/IP Interface Module NPORT 5150A	RS-485 to TCP/IP Interface Module NPORT 5150A	2	No

Note: Fire alarm system shall be supplied as Morley-IAS make and model No. as mentioned in BOQ_FAS. The FAS shall be fully compatible with existing Honeywell Morley Make system installed at different plant location in BARC, It shall be fully configurable and communicating with the existing one to augment the Fire alarm system for Monitoring elsewhere in BARC plant Premises.

Installation, Commissioning & testing of the Fire alarm system to be covered in Item No- 24 0f Schedule –A of NIT

C.1E.1: Detailed Engineering work, Fabrication, supply, Installation, commissioning & testing of UPS power Supply system with required Batteries, Battery holding structure, Tray for UPS, UPS bypass switch, required MCBs, UpS power fail alarm annunciation on PLC panel, UPS Incomer Power Indicating lamp, Power distribution box/panel with arrangement of MCBs, Din-rail, TBs and required Power cables from UPS to Power distribution Box (100 Mtrs Length(approx.)).

BOQ_UPS for for Fabrication, Supply, Installation & testing work for UPS power Supply System with all required accessories and Hardware.

Sr. No.	Description of Item	Brief Specification	Quantity	Unit	Item no. as Per NIT Schedule-

					A (To be covered in NIT Schedule- A, item)
1.	UPS Power System	(vi) **3 phase input, single phase O/P(210-240 V, 10KVA)** Refer UPS_Spec	1	**No**	Item Sr. No 19 of Schedule- A (Supply, detailed engineering of UPS system)
2.	12 Volts, 52 AH battery(min or better)	**02 sets of 16 Batteries Refer: Bat_Spec**	32	No	
3.	Battery stand	(vii) **MS Powder coated, with anchor fastener provision**	02	No	
4.	UPS Stand	(viii) **MS Powder coated, with anchor fastener provision**	01	No	
5.	UPS Power Distribution Panel	**Small panel for mounting of MCBs, MCCBs Power distribution wiring**	02	No	
6.	MCCB(UPS power O/P	**100 A**	01	No	Item Sr. No 24 of Schedule- A (Installation & Commissioning of whole system with required Accessories, Hardware, Support Structures)
7.	MCCB (UPS power Distribution	**63 A**	01	No	
8.	MCCB UPS power Distribution	**32 A**	04	No	
9.	MCB for Battery circuit Isolation	**02 nos of MCBs of 100A rating or more rating ,appropriate for Battery Current rating, Mounted in wall mounted Panel**	01	No	
10.	UPS Bypass Switch	**Appropriate ratting 100A or better**	01	No	
11.	3 pole MCCB for UPS 3 Phase Input Power Isolation	**Appropriate ratting 100A or better**	01	No	
12.	Installation, commissioning & Testing of UPS Power System		01	Job	

Specification of UPS: UPS_Spec

The Approved/Suggested Makes for UPS: APC, Numeric, Emerson, Hitachi-hirel, Aplab, ConsulNeowatt, Delta, Keltron or equivalent

Sl. No.	Required specification type	Specification	Remarks
1	**Type**	**IGBT technology based Double conversion online ups**	
2	**UPS system Components**	**UPS module containing Rectifier, Inverter, Battery Charger, Static Bypass* , and associated Control and Monitor Panel, Maintenance Bypass**	

3	**Topology of the UPS**	**Topology of the UPS must be VFI, Classification 1 (Voltage and Frequency Independent accordingly with classification mentioned in the EN-IEC62040-3 Standard)**	
4	**Redundancy**	**Not required, but UPS shall have inbuilt Static transfer switch to Provide redundancy at future demands**	
5	**Capacity**	**10KVA**	
6	**Static bypass Switch & Maintenance bypass switch**	**If the UPS module must be taken out of the Normal mode for overload, load fault, or internal failures, the static bypass switch shall automatically transfer the critical load to the commercial AC power. Return from Bypass mode to Normal mode of operation shall be automatic. No-break transfer to and from Bypass mode shall be capable of being initiated manually from the front panel. The maintenance by-pass lines of each UPS shall be based on manually operated switches and associated interlocks, which allows the electrical isolation of the static bypass switch, rectifier/charger and inverter, supplying the load directly from the utility for maintenance purposes without interruption of power to those loads. The switch shall be physically isolated from the electronics within the UPS enclosure to ensure safety during maintenance.**	
7	**Charging style**	**Boost & Float/ trickle**	
8	**Input Voltage Range**	**3phase input, 415 – 440 volts**	
9	**Input Frequency Range**	**47-52 Hz**	
10	**Input Power Factor**	**>0.9**	
11	**Output type**	**Single Phase**	
12	**Output voltage to Load**	**230 Volts**	
13	**Output Power Factor**	**>0.9**	
14	**Output frequency**	**47-52 Hz**	
15	**Current crest ratio**	**3:1**	
16	**Total Harmonic distortion**	**within 3% for linear loads & 6% for non linear loads**	
17	**Output voltage regulation**	**±2% or better**	
18	**Output Wave form**	**Pure Sine wave**	
19	**AC mode to Battery Mode**	**Bumpless Transfer**	
20	**Inverter to bypass transfer**	**5 ms or better**	
21	**Efficiency (Battery Mode)**	**90% or better**	
22	**Efficiency (AC mode)**	**90% or better**	
23	**Overload sustaining capability**	**105% - 125% for 1 min, 125% - 150% for 30 Seconds**	

24	**Battery Charging current**	**Shall be capable of charging the fully drained battery in around 16 hours**	
25	**Battery Charging Voltage**	**Suitable for battery bank of 30 or 32 nos. (12V 60Ah batteries)**	
26	**Display**	**LCD Display with mimic**	
27	**Display parameters**	**Display of Battery voltage, charging status, i/p & o/p voltage, i/P & o/p current , ups on battery**	
28	**Audio/visual alarm with Auxiliary contacts**	**audio/visual alarm for faults of Overload condition, low battery voltage or any internal fault (Potential free contact NO type shall be provided. One no contact for ups running status shall be provided**	
29	**Communication Interface**	**Shall be able to transmit data to remote PC/ PLC/SCADA panel over RS485/Ethernet/Modbus link: supporting cards,cable and software shall be provided.**	
30	**Protection**	**Protection against Short circuit, Overload, Low input voltage, Surge in input voltage as per UL 1449, Over heat in the UPS, etc shall be available**	
31	**Cooling**	**Fans shall be available for internal heat dissipation of UPS**	
32	**Ambient conditions**	**up to 45°C @ 95% RH**	
33	**Maintenance bypass**	**Required**	
34	**Safety**	**The UPS shall be certified by Underwriters Laboratories in accordance with UL 1778, 4th Edition**	
35	**Warranty (Minimum)**	**2 years on UPS and 2 Years on batteries**	

Technical Specification of Battery: BAT_Spec
The Approved/Suggested Makes: Amron, Excide, Amarraja, Quanta, Amco or equivalent

Sl. No.	Required specification type	Specification	Remarks
1	**Battery type**	**VRLA, Sealed maintenance free**	
2	**Battery voltage**	**12 V DC, nominal**	
3	**Voltage of Battery Bank**	**Battery bank shall be configured to suit the charging capacity of UPS**	
4	**Battery Capacity & No of Batteries in a Bank**	**As required to meet the full load current of ups running at full load (UPS) for 60 Minutes.**	
5	**Battery Terminal**	**Copper**	
6	**Battery outer body Material**	**Polypropylene Co-Polymer**	
7	**Charging Voltage**	**13.5 VDC approx**	
8	**Charging current**	**Batteries shall be able to accept up to 0.25C charging current(where C is battery Amp-Hr ratting**	
9	**Self Discharge rate**	**within 1% of capacity per week**	
10	**Warranty**	**2 years or more**	
11	**Compliance of standard**	**UL 2003 (MH26669), JIS C 8702, IEC 60896 2004, ISO14001:2004 and ISO9001.2000**	
12	**Battery Bank**	**Battery Bank cabinet/Holding rack type**	

	Cabinet/Rack	**structure of CRCA sheet (steel), shall be able to bear the load of batteries. shall be powder coated inside and outside.**	

C.1F.1: Detailed Engineering work, Fabrication, supply, Installation, commissioning & testing of Access Control system with required RFID card readers, Card Mounting Panel, Double lane full height turnstile gate, Material Entry Door, Masking Rack at side and Top of The Doors, Power supply Units, 8 Port switch with all required accessories, Hardware structure required for complete Installation & commissioning

BOQ_ACS: for Fabrication, Supply, Installation & testing work for Access control system with all required accessories and Hardware

Sr. No.	**Description of Item**	**Brief Specification**	**Quantity**	**Unit**	**Item no. as Per NIT Schedule- A (To be covered in NIT Schedule- A, item)**
1.	Double Lane full Height Trunstile Gate	Refer TG_Spec	1	**No.**	Item Sr. No 20 of Schedule- A (Fabrication, Supply, detailed engineering of Access Control System)
2.	Material entry Gate	SS make with Manual Lock, Refer: TG_Spec	01	No.	
3.	Masking Racks/Grill	SS Make grill, Refer: TG_Spec	02	No.	
4.	RFID Card Readers	Refer: RFID_Spec	06	No.	
5.	Power Supply with required Cabling	Refer: RFID_Spec	04	No.	
6.	8 port Network switch	managed Network switch Refer Managed switch specification, mentioned earlier in this document.	02	No.	
7.	Hardware & accessories required for Installation, Commissioning & testing	(ix) As per Requirements	01	Set	
8.	Installation, Commissioning & testing of System	(x) Complete Installation, Commissioning & testing of System	02	Job	Item Sr. No 24 of Schedule- A (Installation & Commissioning of whole system with required Accessories, Hardware, Support Structures)

Technical Specification of Trunstile Gate: TG_Spec
Full height Double lane electro mechanical hand operated stainless (SS) frame turnstile gate with manual SS bypass gate for material entry and SS grill to cover the gaps:

Sr. No	**Specification**	**Required Specification**	**The approved/Suggested Makes &**	

			Model No	
1	**Gate Type**	**Double lane Full height turnstile**	**Sivananda/Senergy**	
2	**Material type**	**Stainless steel frame and stainless steel rotor**		
3	**Drive**	**Electromechanical hand operated**		
4	**Rotor**	**4 X 90°**		
5	**Function**	**Electronically controlled bi-directional, Passage/lanes shall be site configurable for bi-directional/ IN/EXIT functionality, It shall facility of anti-backup device to prevent reverse rotation once mechanism moved 30deg from its rest position.**		
6	**Passage width**	**Min. 550mm**		
7	**Distance B/w two bars**	**> 5" between two wing bars**		
8	**RFID Reader**	**Shall have the provision to customise the base for installation of RFID reader.**		
9	**Power**	**Single phase 230VAC +/- 10% at 50 Hz.**		
10	**Features (single entry)**	**Shall have the provision to stop two-person entry at a time (Fail safe, Fail Lock/Block).**		
11	**Control box mounting**	**Rotor and other control equipment shall be placed in a protective box atop turnstile gate**		
12	**Certification**	**Shall provide the certification against Electrical and EMI/EMC safety.**		
13	**SS grill and bypass Gate**	**Stainless Steel Grill and By Pass Gate as per drawing.**		

Technical Specification for RFID Card Reader: RFID_Spec:

MIFARE based contactless, Access Control/ Attendance RF card reader(RF + PIN) cum controller for single access door including battery backed power supply. Acceptable make: Senergy*.

*: Acceptable Make for compliance of RFID card reader with existing access control system and fully compliance of system with14443A-4 based BARC ID card.

Quantity: 06 Nos (04 Nos. at entry & exit of double lane turnstile gate and 02 nos as spares)

the supply, testing, installation and commissioning of BARC identity card based access control system Rfid card reader. Access control software is not required, however interfacing of RFID card readers with existing access control system is in supplier's scope of work.

Six numbers of Biometric access control readers must be provided which can be configured as entry reader as well as exit reader. The readers must be able to control the Sivananda/Senergy make Turn stile gate and any other standard turnstile gate.
It should support 14443A-4 based BARC ID card. BARC ID card can be based on the Mifare or Mifare-plus or Desfire or SmartMX contactless technology. Card reader must support all above technology.It should have internal ISO 7816 sam card interface and holder. The sam card must be easily replaceable and must be provided by BARC. The firmware must be field upgradeable. The firmware must support BARC ID card authentication logic
The card reader must be Backlit Tamper resist and with numeric keypad for PIN entry / protected configuration changes. User must be able to change the PIN and same must be written to the card

also.Card reader must have facility to configure different AND & OR combinations with finger print, password as well as BARC identity card swapping.

Tamper detection and Tamper alarm must be provided. System should have anti pass back facility.

Readers must read finger image (400 bytes) from the BARC Smart Card to compare with the live finger. Card readers must have minimum ten discrete levels for finger print matching.

The access control system must be supplied with complete operational, configuration & calibration manual. Circuit diagram and all the technical details must be provided.

If there is communication failure then the card reader must store minimum 25000 transactions with override facility. Software for the same is not required, Configuration & testing of system shall be done with Existing Software for Senergy make Card readers, Configuration & testing of access control system is in supplier's scope.

Any deviation in the quotation for the technical specifications mentioned must be clearly indicated in the quotation.

Card Reader Specifications Quantity: - Six Numbers

8 Sensing Card :BARC Identity Card only
9 Detection technique : Mifare (ISO14443-A)
10 Input voltage Range : 7 to 24V dc
11 Card sensing range : 90-100 mm
12 Card sensing area : Minimum 160x160mm
13 System : microcontroller based & PC compatible
14 Sensor : integrated optical biometric sensor
15 False rejection Ratio : less then 0.1
16 False Acceptance ratio : less then .001
17 Card processing time : less then 1 sec
18 Alphanumeric LCD display : 16x2 Backlit
19 Communication : 100 base T Ethernet connectivity(TCP/IP)
20 Events notification : Audio indication with different melodies
21 Access status : bicolor LED
22 Isolated Digital inputs : 4 numbers
23 Isolated Digital Outputs : 4 Numbers
24 Configurable employees : 99999 access conditions
25 Internal Memory : 256 KB (min. 25000 transaction Storage facility)
26 Card Read/Write Facility : ISO14443-B or ISO15693
27 Biometric sensor must store image size in minimum 280×320 pixles.
28 Biometric sensor sensing area must be minimum 16×19 mm
29 Resolution of biometric sensor must be greater then 500 dpi.
30 There must be facility to configure the gate as open or close in the case of power failure of card reader system
31 Gate opening time should be configurable
32 Card readers must have anti pass back (APB) facility and it must be configurable.
33 Card readers must have facility to check the validity of the card.
34 Card reader must have Flush mounting facilty to mount the card reader Just above wall surface.
35 Card reader must have arrangement for easy installation and maintenance.
36 The inputs must be protected against over-voltage, reverse polarity and over current.
37 Self diagnostics features for readers must be there.
38 Keypad of the card readers must be of Industrial standard

Physical specifications of Card Readers:-

a) Weight : Not greater than 700 gms
b) Size : 160 mm WX160 mm LX60 mm H

c) Operating Temperature : 5 to 55 Deg. C

d) Humidity : 0-95% RH (Non-condensing)
e) Enclosure : ABS
f) Ingress Protection : IP65

Installation, Commissioning & testing of System of Access control system:

1. Fabrication of Access control Turnstile gate, Material entry gate, Masking Grill as per pre-approved drawings and dimensions.
2. Installation at site.
3. cable laying work for Minimum required power & Network cables (laying of cables in PVC Conduit).
4. Installation of Rfid card readers with required accessories and supportive hardware.
5. Interfacing of RfID card readers with existing access control system.
6. Completing testing of access control system.
7. preparation & submission of Installation & commissioning reports.

BOQ for Installation & commissioning of Whole system: BOQ_Inst_Comm

Sr. no.	Description of Item	Brief Specification	Quantity	Unit	Item no. as Per NIT Schedule- A (To be covered in NIT Schedule- A, item)
01	Installation, Commissioning & Testing of PLC System with all required accessories	As per requirement with required Accessories and Hardware, Support Structure/Fixtures, etc*	**01**	**job**	Item Sr. No 24 of Schedule- A (Installation & Commissioning of whole system with required Accessories, Hardware, Support Structures)
02	Installation, Commissioning & Testing of SCADA System	As per requirement with required Accessories and Hardware, Support Structure/Fixtures, etc*	**01**	**job**	
03	Installation, Commissioning & Testing of Networking system	As per requirement with required Accessories and Hardware, Support Structure/Fixtures, etc*	**01**	**job**	
04	Installation, Commissioning & Testing of CCtv System	As per requirement with required Accessories and Hardware, Support Structure/Fixtures, etc*	**01**	**job**	
05	Installation, Commissioning & Testing of UPS System	As per requirement with required Accessories and Hardware, Support Structure/Fixtures, etc*	**01**	**job**	
06	Installation, Commissioning & Testing of Fire Alarm System	As per requirement with required Accessories and Hardware, Support Structure/Fixtures, etc*	**01**	**job**	
07	Installation, Commissioning & Testing of Access Control System	As per requirement with required Accessories and Hardware, Support Structure/Fixtures, etc*	**01**	**job**	
08	Mounting/ support	As per Requirements	01	Set	

	structure for Field Instruments Installation (as per requirements)				
09	Signal termination work with tagging	Termination of all field instruments/Equipment/Devices , PLC I/Os, for interfacing with PLC based Process Monitoring & control system with Proper tagging (double ferule tagging) and testing of field cable integrity and continuity	10000	Points	Item Sr. No 22 of Schedule- A (Signal cable Termination & testing work with tagging)

*: Note: Following conditions are applied

1. Fabrication & Supply of Hardware, Support Structure/Fixtures, required for complete Installation & commissioning of individual system, shall be provided by Supplier/Bidder. Purchaser/Client (BARC, Tarapur) will not Provide any Material, tool, Workshop facility for the fabrication of the required Hardware, Support Structure/Fixtures.

2. Installation & commissioning Scope of work for Individual system has been mentioned in this document in details. All works those are not mentioned in this technical specification section of tender document, but required for Installation, commissioning & testing of Individual system and complete testing of whole system, shall be in supplier's scope of work.

3. Successful bidder has to submit the Project execution plan in advance as per work order time period deadline.

SECTION - VI

SCHEDULE - A to F

Schedule A

Ref. No.:BARC(T)/NRB/R&WM/WPF/E&I/C&I-FAS-CCTV/2025-26/WORK

Name of work: Detailed Engineering, Fabrication, supply, Installation & Commissioning of control & Instrumentation system, CCTV Surveillance System, UPS System, Access Control system & fire alarm monitoring system for WPF plant at BARC/NRB Tarapur.

Sr. No.	Items	Qty.	Rate/Unit(INR)	Amount (INR)
1.	Fabrication, Supply, Detailed Engineering of Pressure Measurement System	01 job		
2.	Fabrication, Supply, Detailed Engineering of Flow Measurement & control System	01 job		
3.	Fabrication, Supply, Detailed Engineering of Miscellaneous Process Measurement & control system	01 job		
4.	Fabrication, Supply, Detailed Engineering of Temperature Measurement System	01 job		
5.	Fabrication & Supply of ¼"SS Tubes	2500 Mtrs		
6.	Fabrication & Supply of ½ "SS Tubes	500 Mtrs		
7.	Fabrication & Supply Of SS Tube Fittings	01 job		
8.	Fabrication & Supply of Valves & Accessories	01 job		
9.	Fabrication & Supply, Installation of Cable Tray	750 Mtrs.		
10.	Fabrication , Supply of Single Pair Instrumentation Cables	5000 Mtrs		
11.	Fabrication, Supply of 6 Pair Instrumentation Cables	2000 Mtrs		
12.	Fabrication , Supply of 20 Pair Instrumentation Cables	3000 Mtrs		
13.	Fabrication , Supply of 10 Pair Instrumentation Cables	2000 Mtrs		
14.	Fabrication, Supply, Detailed Engineering of PLC based Data Monitoring & Control system.	01 job		
15.	Supply, Configuration & Detailed Engineering of SCADA System for Process Control	01 job		
16.	Supply, Detailed Engineering Networking System	01 job		
17.	Supply, Detailed Engineering CCTv Surveillance System	01 job		
18.	Supply, Detailed Engineering of Fire Alarm System	01 job		
19.	Supply, Detailed Engineering of UPS System	01 job		
20.	Fabrication, Supply, Detailed Engineering of Access Control System	01 job		
21.	cable laying work with required accessories & hardware	10000 Mtrs		
22.	Signal cable Termination & testing work with tagging	10000 Nos.		

23.	SS tube Laying & installation, commissioning & testing of Tube fittings	1500 Mtrs		
24.	Installation & commissioning of whole system with required Accessories, Hardware, Support Structures	01 Job		
25.	Installation of field Instruments with required accessories, Hardware & tagging,	500 Nos.		
Grand Total				
Grand Total in words				

Declaration:

- We hereby confirm that the rates quoted shall remain firm throughout the term of the contract.
- We hereby confirm that the rates quoted include all applicable taxes and duties & GST.
- We confirm that we have clearly understood the scope of work and technical specifications.
- We confirm that the above rates include cost of transportation, labour etc.

PROFORMA OF SCHEDULES

Name of work: "Detailed Engineering, Fabrication, supply, Installation & Commissioning of control & Instrumentation system, CCTV Surveillance System, UPS System, Access Control system & fire alarm monitoring system for WPF plant at BARC/NRB Tarapur".

Ref: NIT No. - **BARC(T)/NRB/R&WM/WPF/E&I/C&I-FAS-CCTV/2025-26/WORK**

SCHEDULE – A - Schedule of Quantities (Enclosed Separately)

SCHEDULE – B – Material to be issued by Department

Sr. No.	Particulars	Unit	Quantity	Rate in Rs.	Availability
1	Water	KL	As required	-	Single supply point near work site

Connected load (in KW)	Fixed Charge (in Rs.)	Variable charge in Rs.	Electricity duty
0-20 kw	517/ month	9.69	%21of (Fixed + Variable charge)
Above 20 kw & ≤ 50 kw	517/kw/month	14.18	
> 50 kw	517/kw/month	16.55	

2	Electricity	kWh	As required	As per Note-1 mentioned below	Single power point near work site

Electricity Charges :

Notes :

24 All the items of Schedule-B will be accounted on monthly basis.

25 Services to be rendered by the department are not mandatory; delay caused on this account shall not be taken as reason for extension of contract period.

26 All materials used for power distribution shall be offered for inspection / approval, if asked by NRB, BARC and shall be changed / replaced by Contractor, if deemed necessary by NRB, BARC.

SCHEDULE – C : NOT APPLICABLE

Tools and plants to be hired to the contractor

SCHEDULE – D : NOT APPLICABLE

Extra Schedule for specific requirements/documents for the work; if any

SCHEDULE – E

Name of work :"Detailed Engineering, Fabrication, supply, Installation & Commissioning of control & Instrumentation system, CCTV Surveillance System, UPS System, Access Control system & fire alarm monitoring system for WPF plant at BARC/NRB Tarapur".

NIT cost of work : Rs 3,10,00,000 (Rupees Three Crores Ten Lakh Only)

Earnest Money : Rs. 6,20,000/- (Rupees Six Lakh Twenty Lakh only)

Performance Guarantee : 5% of tendered value

Security Deposit : 2.5% of tendered value

SCHEDULE – F

Reference to General Conditions of Contract

GENERAL RULES & DIRECTIONS

Officer inviting tender : Kapil Chaturvedi, NRB, BARC

Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3: See below

Definitions:

2(e) Engineer-in-Charge : As intimated in the Work Order

2(g) Accepting Authority : GM, R&WM,INRPO, NRB, BARC

2(i) Percentage on cost of materials and Labour to cover all overheads and profits: 15%

2(k) Standard Schedule of Rates: BARC SOR 2023

2(l) Department : Nuclear Recycle Board, BARC,DAE

Clause 1

(i) Time allowed for submission of Performance Guarantee: 15 days from the date of issue of work order or before commencement of work whichever is earlier.

(ii) Maximum allowable extension beyond the period provided in (i) above: Can be further extended at the written request of the contractor for a maximum period ranging from 1 to 15 days with late fee @0.1% per day, of Performance Guarantee amount.

If contractor fails to furnish the prescribed Performance Guarantee within the prescribed period,
the Government shall without prejudice to any right or remedy, be at liberty to forfeit the Earnest Money absolutely.

Clause 2

Authority for fixing compensation under Clause-2: **GM, R&WM,INRPO, NRB, BARC**

Clause 2A : Not applicable

Clause 5

i. Number of days from the date of issue of work : 15th day from the date of issue of work order
order for reckoning date of start or actual date of start of work whichever is earlier.

ii. Time allowed for completion of work: 12 Months

Table of Mile Stone(s) If applicable : NA

Clause 6, 6A - Clause applicable: 6A

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: 10,00,000/-. (Rupees Ten Lakhs)

Clause 10A

List of testing equipments to be provided by the contractor at site lab:

a. Network Testing Tools & accessories
b. Pressure Calibrator & Multifunction calibrator

Clause 10B : Not Applicable

Clause 10C : Not Applicable

Clause 10CA : Not Applicable

Clause 10CC : Not Applicable
Clause 10CC will be applicable in contracts where the stipulated period for completion is more than 12 months :

Clause 11: Applicable
Specifications to be followed for execution of work: BARC Specifications, Drawings, Indian Standards and Special Publication

Clause 12: Applicable

12.2 & 12.3	Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for building work	30% for superstructure
12.2 & 12.3	Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for maintenance work	30% for maintenance
12.5	Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for foundation work	100% for substructure

Clause 16
Competent Authority for deciding reduced rates : **GM, R&WM,INRPO,NRB, BARC**

Clause 18
Suggestive List of Machinery, Tools &Plants to be deployed by the Contractor at site:-
1. Hydra/Scaffolding ladder for Installation work at Height
2. **Crimping tool, SS Tube bender**

Clause 25: As per GCC

Clause 36(i) Not Applicable

Clause 42 : Not Applicable

12/11/24

E.D. (FF) & Director GSO (T)
NRB, BARC
For and on behalf of President of India

APPENDIX –'A'

BID SECURITY (BANK GUARANTEE)
(on Non-judicial stamp paper of value ` 100/-)

WHERE AS _____ (Name of Bidder) (herein after called "the Bidder") has submitted his bid dated _____ (date) for undertaking the work of _____ (Name of work) (hereinafter called "the Bid").

KNOW ALL PEOPLE by these presents that We _____ (Name of bank) of _____ (Name of country) having our registered office at _____ (hereinafter called "the Bank") are bound to President of India, acting through Chief Engineer, BARC, Trombay, Mumbai 400 085 for the sum of ` _____ (1) for which payment will and truly be made to be said BARC, Trombay, the Bank binds itself, his successors and assigns by these presents.

SEALED with the common seal of the said Bank this _____ day of 2011.

THE CONDITIONS of this obligation are:

(1) If after Bid opening the Bidder withdraws his Bid during the period of Bid validity specified in the Form of Bid or makes any modification in the terms and conditions of the tender which are not acceptable to BARC, Trombay OR

(2) If the Bidder having been notified of the acceptance of his Bid by BARC, Trombay during the period of bid validity

(a) Fails or refuses to execute the Form of Agreement in accordance with the instructions of Bidders, if required; OR

(b) Fails to commence the work specified in the tender document in prescribed time.

We _____ (Name of the Bank & Branch) undertake to pay BARC upto the above amount upon receipt of their first written demand, without BARC, Trombay having to substantiate their demand, provided that in their demand BARC will note that the amount claimed by them is due to them owing to the occurrence of one or any of the above conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date _____ (2). This date may be extended by Chief Engineer, BARC, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE _____ SIGNATURE OF THE BANK _____

WITNESS _____

SEAL _____

(Signature, name and address)

Notes:

1. The Bidder should insert the amount of Guarantee in words and figures denominated in Indian Rupees. This figure should be the same as specified in the tender document.
2. This date should be 45 days after the end of validity period of the Bid, reckoning from the deadline for submission of Bids which is stated in the tender document.

1. **APPENDIX-'B'**

FORM OF BANK GUARANTEE BOND FOR PERFORMANCE SECURITY / SECURITYDEPOSIT

1. 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, we…..…… ……..(Indicate the name of the Bank) (hereinafter referred to as "the Bank") hereby undertake to pay to the Government an amount not exceeding Rs. . (Rs.....……only) on demand by the Government.

2. We …….. (indicate the name of Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demur, 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 thereunder and the Contractor(s) shall have no claim against us for making such payment.

4. We…….. (indicate the 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 the 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 …… (indicate the 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 to 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, …….. (indicate the 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 the date of expiry or the extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Signed and sealed

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

APPENDIX 'C'

INDENTURE FOR SECURED ADVANCE

(For use in cases in which the contract is for finished work and the contractor has entered into an agreement for the execution of a certain specified quantity of work in a given time.)

Government of India

Department of Atomic Energy

State : Maharashtra

Administration : Department of Atomic Energy

Division : TWMP, NRB, BARC Tarapur.

THIS INDENTURE made the.....day of .....19..... BETWEEN ..... (hereinafter called the Contractor which expression shall where the context so admits or implies be deemed to include his executors, administrators and assigns) of the one part and the President (hereinafter called the President which expression shall where the context so admits or implies be deemed to include his successors in office and assigns) of the other part.

WHEREAS by an agreement dated ..... (hereinafter called the said agreement) the contractor has agreed.

AND WHEREAS the contractor has applied to the President that he may be allowed advance on the security of materials absolutely belonging to him and brought by him to the site of the works, he subject of the said agreement for use in the construction of such of the works as he has undertaken to execute at rates fixed for the finished work (inclusive of the cost of materials and labour and other charges).

AND WHEREAS the President has agreed to advance to the contractor the sum of Rs ....on the security of materials, the quantities and other particulars of which are detailed in Part-II of a Running Account Bill (B) for the said works signed by the contractor on ..... and the President has reserved to himself the option of making any further advances on the security of other materials brought by the contractor to the site of the said works.

NOW THIS INDENTURE WITNESSETH that in pursuance of the said agreement and in consideration of the sum of Rs. ..... on or before the execution of these presents paid to the contractor by the President (the receipt where of the contractor both hereby acknowledge and of such further advance, if any, as may be made to him as aforesaid the contractor both hereby convenent and agree with the President and declare as follows:

1. That the said sum of Rupees .....so advanced by the President to the contractor as aforesaid and all or any further sum or sums advanced as aforesaid shall be employed by the contractor in or towards expenditure the execution of the said works and for no other purpose whatsoever.

2. That the materials detailed in the said Running Account Bill (B) which have been offered to and accepted by the President as security are absolutely the contractor's own property and free from encumbrances of any kind and the contractor will not make any application for or receives a further advance on the security of materials which are not absolutely his own property and free from encumbrance of any kind and the contractor indemnifies and president against all claims to any materials in respect of which an advance has been made to him as aforesaid.

3. That the materials detailed in the said Running Account Bill (B) and all other materials on the security of which any further advance or advances may hereafter to be made as aforesaid (hereinafter called the said materials) shall be used by the contractor solely in the execution of the said works in accordance with the directions of the Divisional Officer of the said works, Civil Engineering Division (hereinafter called "the Divisional Officer) and in the terms of the said agreement.

4. That the contractor shall make at his own cost all necessary and adequate arrangements for the proper watch, safe-custody and protections against all risks of the said materials and that until used in construction as aforesaid said materials shall remain at the site of the said works in the contractor's custody and on his own responsibility and shall at all times be open to inspection by the Divisional Officer or any officer authorised by him. In the event of the materials or any part thereof being stolen, destroyed or damaged or becoming deteriorated in a greater degree that is due to reasonable use and wear thereof the contractor will forthwith replace the same with other materials of like quality or repair and make good the same as required by the Divisional Officer.

5. That the said materials shall not on any account be removed from the site of the works except with the written permission of the Divisional Officer or an officer authorised by him on that behalf.

6. That the advance shall be repayable in full when or before contractor receives payment from the President of the price payable to him for the said works under the terms and provisions of the said agreement. Provided that if any intermediate payments are made to the contractor on account of work done thereon the occasion of each such payment the President will be at liberty to make a recovery from the contractor's bill for such payment by deduction there from the value of the said materials than actually used in the construction and in respect of which recovery has not been made previously the value for this purpose being determined in respect of the each description of materials at the rates at which the amounts of the advances made under these presents were calculated.

7. That if the contractor shall at any time make any default in the performance or observance in any respect of any of the terms and provisions of the said agreement or of these presents the total amount of the advance or advances what may still be owing to the President shall immediately on the happening of such default be repayable by the contractor to the President together with interest thereon at twelve percent per annum from the date of respective dates of such advance or advances to the date of repayment and with all costs, charges, damages and expenses incurred by the President in or for the recovery thereof or the enforcement of this security or otherwise by reasons of the default of the contractor and contractor hereby convenants and agrees with the President to repay and pay the same respectively, to him accordingly.

8. That the contractor hereby charges all the said materials with the repayment to the President of India the said sum of Rs. and any further sum or sums advanced as aforesaid and all costs, charges, damages and expenses payable under these presents PROVIDED ALWAYS and it is hereby agreed and declared that not-withstanding anything in the said agreement and without prejudice to the powers contained therein if and whenever the convenant for Payment and repayment herein before contained shall become enforceable and the money owing shall not be paid in accordance there with the President may at any time thereafter adopt all or any of the following courses as he may deemed best.

a) Seize and utilise the said materials or any part thereof in the completion of the said works on behalf of the contractor in accordance with the provisions in that behalf contained in the said agreement debiting the contractor with the actual cost of effecting such completion and the amount due in respect of advances under these present and crediting the contractor with the value of work done as if he had carried it out in accordance with the said agreement and at the rates thereby provided. If the balance is against the contractor he is to pay same to the President on demand.

b) Remove and sell by public auction the seized materials or any part thereof and out of the moneys arising from the sale retain all the sum, aforesaid repayable or payable to the President under these presents and pay over the surplus (if any) to the contractor.

c) Deduct all or any part of the money owing out of the security deposit or any sum due to the contractor under the said agreement.

9. That except in the event of such default on the part of the contractor as aforesaid interest on the said advances shall not be payable.

10. That in the event of any conflict between the provisions of these presents and the said agreement the provisions of these presents shall prevail and the event of any dispute or difference arising over the construction or effect of these presents the settlement of which has not been herein before expressly provided for the same shall be referred to the Chief Engineer, Directorate of Construction, Services and Estate Management, time being in force shall apply to any such reference.

IN WITNESS thereof the said ..... and…….

by the order under the direction of the President have hereinto set their respective hands the day and year first above written.

Signed, sealed and delivered by the said contractor in the presence of :

Signature

Name

Address

Witness

Signed by by the order and direction of the President in the presence

of:

Signature

Name

Witness Address

* * * * * * * * * * * * * *

APPENDIX - 'D'

PROFORMA FOR GUARANTEE TO BE EXECUTED BY THE CONTRACTORS FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF WATERPROOFINGWORKS.

Name of work:

Work order No:

Agreement No:

This agreement made this _____day of_____ two thousand and_____between _____

(hereinafter called the Guarantor of the other part) and the PRESIDENT OF INDIA through

_____ _____

(hereinafter called the Government of the one part)

WHEREAS THIS agreement is supplementary to a contract (hereinafter called the Contractor dated and made between the GUARANTOR OF THE ONE PART AND GOVERNMENT of the other part, whereby the Contractor, interalia, undertook to render the buildings and structures in the said contract recited completely water and leakproof.

AND WHERE THE GUARANTOR agreed to give a guarantee to the effect that the saids structures will remain water and leak proof for _____years from the date of _____.

NOW THE GUARANTOR hereby guarantees that waterproofing treatment given by him will render the structures completely leakproof and the minimum life of such waterproofing treatment shall be 10 years to be reckoned from the date after the maintenance period prescribed in the contract.

Provided that the guarantor will not be responsible for leakage caused by earthquake or structural defects or misuse / alteration of structures and for such purpose:

(a) misuse shall mean operation which will damage treatment, like chopping of firewood and things of the same nature which might cause damage.

(b) Alteration shall mean construction of an additional structure or a part or construction adjoining to existing structure whereby treatment is removed in parts.

(c) the decision of the Chief Engineer with regard to cause of leakage shall be final.

During this period of guarantee the guarantor shall make good all defects and in case of any defect being found render the building waterproof to the satisfaction of the Engineer-inCharge at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from the Engineer-in-Charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the guarantor's cost & risk. The decision of the Engineer-in-Charge as to the cost payable by the Guarantor shall be final and binding.

That if the Guarantor fails to execute the waterproofing or commits breach thereunder then the Guarantor will indemnify the Principal and his successors against all loss damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the Guarantor in performance and observance of this supplemented agreement. As to the amount of loss and/or damage and cost incurred by the Government the decision of Engineer-in-Charge will be final & binding on the parties.

IN WITNESS WHEREOF these presents have been executed by the Obligator (Guarantor)_____and _____ for and on behalf of the President of India on the day, month and year first above written.

SIGNED SEALED AND DELIVERED BY (Obligator / Guarantor) in the presence of:

1.

2.

Signed for and on behalf of the President of India in the presence of

1.

2.

* * *

APPENDIX - 'E'

GUARANTEE BOND FOR ANTITERMITE TREATMENT

(For Guarantee to be executed by contractors for removal of defects after completion of antitermite treatment works)

This agreement made this……day of … two thousand hundred……..between M/s. _____ (hereinafter called "the Guarantor of the one part) and the PRESIDENT OF INDIA (hereinafter called "the Government" of the other part.)

Whereas this agreement is supplementary to a contract (hereinafter called "the Contract) dated…..and made between the Guarantor of the one part and the Government of the other part whereby the Contractor inter-alia undertook to render the buildings and structure completely termite proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said structure will remain termite proof for ten years from the date of handing over of the building and or completion date of contract whichever is later.

NOW THE GUARANTOR hereby guarantees that the anti-termite treatment provided by him will render the structures completely termite proof and the minimum life of such antitermite treatment shall be ten years to be reckoned from the date of handing over of the building and/or completion of the building whichever is later.

Provided that the Guarantor will not responsible for damages caused due to structural defects or misuse of premises/area.

a) Misuse of premises shall mean any operation which will disturb the chemical barrier like excavation under floors, breaking of walls at G.L. disturbing the treatment already carried out.

The decision of the Engineer-in-Charge with regard to cause of damage shall be final.

During this period of guarantee the guarantor shall make all the arrangements to do the post constructional anti-termite treatment in all the buildings in case of any termite nuisance being found in the building, to the satisfaction of the Engineer-in-Charge at the cost of guarantor and shall commence the work for such treatment within seven days from the date of calling upon him to rectify the defects, by the Engineer-in-Charge, failing which the work shall be got done by the Department by some other contractor at the GUARANTOR'S COST and risk. The decision of the Engineer-in-Charge as to the cost payable by the Guarantor shall be final and binding.

That if the Guarantor fails to execute the anti-termite treatment or commits breach there under then the Guarantor will indemnify the principal and his successors against all loss, damage, cost, expense or otherwise which may be incurred by the Department by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and/or cost incurred by the Government the decision of the Engineer-in-Charge will be final and binding on the parties.

IN WITNESS WHEREOF these presents have been executed by the Obligator… and by….and for and on behalf of the PRESIDENT OF INDIA on the day, month and year first above written.

SIGNED, sealed and delivered by (OBLIGATOR) in the presence of :

1.

2.

SIGNED FOR AND ON BEHALF OF THE PRESIDENT OF INDIA BY . ..... in the presence of:

1. 2.

ANNEXURE A

STATEMENT OF MAN & MACHINERY DEPLOYMENT

NAME OF WORK: Fabrication and Installation of Transmitter racks, SS tubes & fittings, Purge Rotameters, installation of DP transmitters and associated SS tubing work

Tender Notice No.: TWMP/UD/KSV/SG/Oct/2018/01/NIT/01/OPA-1818 dtd 25.02.2019.

Date of receipt of tender :

Date of opening of tender :

Time of Completion :

Name of Tenderer :

Have Tendered visited the site of work:

STATEMENT OF MAN & MACHINERY.

Sl. No	Description	To be deployed by the bidder.
1.	Manpower Deployment	
a.	Engineer	
b.	Supervisor	
c.	Electrician	
d.	Helper	
e.	Labor	
2.	Machinery Deployment	**Please Attach separate sheet.** Data should contain make of equipment, make, manufacturing year, last calibration, calibration valid upto, Sl. No. of machine.

Signature with company seal & date.

NOTE: 1) It is noted that the above deployment is minimum. After detailed programming and actual condition at site, additional deployment shall be done as necessary for completion of the work within the stipulated time period.

2) It is mandatory to fill up ANNEXURE – A by the tenderer. Non-compliance of the same, tender may be rejected.

Date:_____ Signature of Tenderer

with Seal

A N N E X U R E - B 1

STATEMENT OF CASH FLOW FOR THE WORK.

Sr. No.	Months	Cash Flow %	
1	1 st		%
2	2 nd		%
3	3rd		%
4	4 th		%
5	5 th		%
6	6 th		%
7	7 th		%
8	8 th		%
9	9 th		%
10	10 th		%
11	11 th		%
12	12 th		%
13	13 th		%
14	14 th		%
15	15 th		%
16	16 th		%
17	17 th		%
18	18 th		%
19	19 th		%
20	20 th		%
21	21st		%
22	22nd		%
23	23rd		%
24	24th		%
25	25th		%
26	26th		%
27	27th		%
28	28th		%
29	29th		%

30	30th		%
31	31st		%
32	32nd		%
33	33rd		%
34	34th		%
35	35th		%
36	36th		%
	Total	100 %	

NOTE: It is mandatory to fill up the ANNEXURE-C by the contractor.
Non-compliance of the same, the tender may be rejected.

Date: *Signature of Tenderer*
with Seal

Annexure C

Vendor Evaluation Proforma.

1. General.

a) Referance:

i. Tender Enquiry No.

ii. Material.

iii. Quotation No. & Date.

b) Vendor Details.

i. Name:

ii. Office Address with pincode, phone number, & fax no.

e-mail:

iii. Works address with Pincode, phone number & fax No.

e-mail:

iv. Contact Person:

v. Ownership of premises:

vi. Registration details with registration no. with date & expiry date.

Organization:

i. Nature:

ii. State / Central undertaking:

iii. Public / Pvt. Ltd.

iv. Partnership.

v. Proprietary.

vi. Top management. (Name, Qualification & Position)

vii. Commercial performance over the past two years.

viii. Date of Inception.

ix. Anticipated performance for the year.

x. Details of facilities

a) Floor Area.

b) Key Departments.

2. Contract & license details.

a) Collaboration:

i. Name of Collaboration.

ii. Nature of Collaboration.

iii. Present Status.

b) Import license details.

c) Raw material contract details (if any).

d) Maximum demand power & available connection & captive power plant size.

e) Weather products ISI marked / ISI certification availed.

3. **Activity Details.**

a) Trader or manufacturer.

b) Product handled or manufactured.

c) Development (List of major clients) (*Attach separate sheet if necessary)*

4. Manpower & facilities.

a) Skilled

b) Semi & unskilled.

c) Welder

d) Winder.

e) Supervisor.

f) Design engineer.

g) Office Staff.

h) Production engineers.

i) Draftsman.

5. Documentation.

a) General reference standards.

b) Standard specific to tender.

c) Plant standard availability:

i. Procurement standards.

ii. Inspection standards.

iii. Fabrication standards.

d) Test certificates of materials procured – as issued by material manufacturer. (*Attach separate sheet if necessary).*

e) Inward Inspection (material).

f) Process inspection.

g) Final Inspection.

6. List of machinery at works.
(Attach Separate sheet if necessary)

7. List of testing facilities available at works.
(Attach separate sheet if necessary)

8. Write-up on quality control & test procedures.
(*Attach separate sheet if necessary)*

9. Test certificates from CPRI / ERDA/ ITI or equivalent laboratory or institution for finished products. *(Attach Separate sheet if necessary).*

10. List of Major Clients.
(Attach separate sheet if necessary)

11. List of major supplies / maintenance work taken up during the last 2 (two) years.
(Attach Separate sheet if necessary)

12. Catalogs / leaflets for the finished products, details.
(Attach sepetare sheet if necessary)

13. List of appendices/annexures to the tender.
(Please note that the appendices/annexures list form an integral part of this tender document.)

Date: **Signature of tenderer with seal.**

Note:

1. **The tenderer shall invariably provide entries against all items listed above. If any clause is not applicable, it should be clearly mentioned.**
2. **Wherever separate sheet is attached for a clause, it should be numbered, & clearly mentioned in front of the clause.**
   Vendor evaluation Proforma may be attached with other documents.