Bharat Heavy Electricals Ltd.,
Electronics Division,
Mysore Road, Bangalore – 560 026

Tender Document for " Supply and E&C Support services for CCTV System (Plant Security System) for Ennore 2X660MW & North Chennai 1X800M (Ref. NKR0000220)

TENDER REFERENCE DOC	NKR0000220
TENDER DOCUMENT AVAILABLE FROM	Refer eprocurement system website
LAST DATE AND TIME FOR SUBMISSION OF TENDER	Refer eprocurement system website
DATE AND TIME FOR TENDER OPENING	Refer eprocurement system website
SUBMISSION OF TENDER	Bidder to submit tender in E-procurement site : https://bheleps.buyjunction.in/. Refer instructions give in tender document for offer submission of bid in E-procurement site. Service provider: M-junction

This Tender Document Contains documents as per below index:

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REQUEST FOR QUOTATION

BHARAT HEAVY ELECTRICALS LIMITED
Electronics Division
PB No. 2606, Mysore Road Bangalore - 560026
INDIA

RFQ NUMBER: NKR0000220
RFQ DATE: REFER EPROCUREMENT SYSTEM
RFQ DUE DATE: REFER EPROCUREMENT SYSTEM

(for all correspondence)
Purchase Executive : Nilmani Kumar
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Sl No.	Material Code	Description	Qty	Unit
1	PR0900000137	IP CCTV System FOR ENNORE PROJECT -IP BASED CLOSE CIRCUIT TELEVISION INCLUDING ITEMS LIKE CAMERA, LENSES AND ACCESSORIES AS PER SPEC: RARITPS/415/CCTV REV 00	1	Set
2	PR0880000180	Mandatory Spares CCTV system FOR ENNORE PROJECT	1	Set
3	PR0900000137	IP CCTV System FOR NORTH CHENNAI PROJECT -IP BASED CLOSE CIRCUIT TELEVISION INCLUDING ITEMS LIKE CAMERA, LENSES AND ACCESSORIES AS PER SPEC: RARITPS/415/CCTV REV 00	1	Set
4	PR0880000180	Mandatory Spares CCTV system FOR NORTH CHENNAI PROJECT	1	Set

i). This is only RFQ not an order.
ii). In all correspondence quote RFQ No. & due date.
iii). Quotation should remain valid for a minimum peiod of 120 days from due date.
iv). In case of non-receipt of Quotation or regret letter for 4 consecutive RFQs you are liable to be removed from our vendors list.

PROJECT : ENNORE 2 x 660 MW

CUSTOMER : TANGEDCO

EQUIPMENT : IP CCTV SYSTEM, PERIMETER INTRUSION DETECTION SYSTEM, ACCESS CONTROL SYSTEM & PATROL GUARD SYSTEM

REVISION HISTORY SHEET

REV No.	DATE	NATURE OF CHANGE	REASON	PREPARED BY	REVIEWED BY
00	08.01.2018	FIRST ISSUE	---	AKS	KRS

SECTION- A

GENERAL INSTRUCTIONS TO BIDDERS:

Introduction: Bidders are required to submit technical offer for supply, installation and commissioning of IP based CCTV system, Perimeter intrusion detection system, Access Control System and Patrol Guard Monitoring System for Ennore 2x660MW and North Chennai 1x800MW project. All required documents against this Tender/Specification shall be submitted in English only.

Pre-qualification requirements (PQR) are clearly mentioned in Section-B of this Specification. In case Bidder does not meet Pre-qualification requirements, their offer will be summarily rejected and Bidder's Technical offers will not be evaluated.

1. Submission of documents:

a. Documents listed in section-B of this specification for meeting Pre Qualification Requirements (PQR) should be submitted in a separate cover with "section-B- Pre Qualification " written on cover.

b. Technical offer / proposal as per section-C of this specification should be submitted in a separate cover with "Section-C technical offer" written on cover.

2. Evaluation methodology:

a. Bidder's PQR document cover only will be opened first for review and evaluation by BHEL. In case the bidders offer do not meet the PQR, then corresponding techno-commercial offer will not be considered for further evaluation in the tender. Technical bids of those bidders who meet PQR shall be opened for review and further consideration.

b. Bidders declared qualified for meeting Pre Qualification Requirements mentioned in section B and are presently not registered with BHEL EDN Bangalore for supplying the charger system, shall be informed by email to submit online BHEL vendor registration form at www.bhel.com. Further, bidders meeting PQR criteria but are not already approved vendors by M/s TANGEDCO for the project, their credential documents as provided by bidder under section-B, shall be forwarded to M/s TANGEDCO for approval. Vendors who are not approved by M/s TANGEDCO, their offer will be technically rejected and shall not be considered for further process for procurement.

c. If required during evaluation of PQR and Technical offers/bids, vendor should be present at BHEL Electronic Division, Bangalore, for discussions. Further in the event of order, during approval of the Vendor documents by Customer, Vendor shall accompany BHEL representative for discussions with customer / consultant.

d. This specification does not prohibit any vendor to submit their offer along with clause wise deviation from the specification. Changes in technical specification / Scope etc shall be informed to Participating bidders only.

SECTION- B

Pre-Qualification Requirements (PQR)

a) Offered system, shall be from latest proven product range and of qualified/reputed manufacturer whose successful performance has been established by a considerable record of satisfactory operation in a coal fired power station of 500MW or above rating as on techno-commercial bid submission date.

b) Bidder and their offered system must have a proven performance of at least two sets installed in a power plant of 500MW and above rating and have been running successfully for at least two years as on techno-commercial bid submission date of this tender. No prototype components shall be used.

In order to evaluate above two PQR, following documents must be submitted for meeting above requirements:

i) Unpriced Purchase Order Copies along with Bill of material specifying makes.

ii) Performance certificates issued by end customer, mentioning bidder has having commissioned CCTV system and is running successfully.

iii) List of past supplies in tabular form mentioning name of project, year of supply, year of commissioning, make of system etc

c) Original Equipment Manufacturers (OEM) of CCTV system, Perimeter Intrusion detection system and Access Control System based outside India, who are submitting offer for this tender, shall have authorized representatives in India for support related to Documentation, technical support, troubleshooting, Erection, Commissioning and other co-ordination work. Letter from OEM detailing Indian representative details should be provided. OEM to also furnish an undertaking letter that in case of change in Indian representative / agent, OEM shall continue to support for commissioning and troubleshooting the supplies made through this tender.

d) System Integrators participating on behalf of OEM of cameras of CCTV system, OEM of cameras of Perimeter Intrusion detection system and OEM of Access Control System should submit Manufacturer Authorisation Letter from OEM for their consent to participate in this tender and for further support / troubleshooting during commissioning and operation of the systems. The letter should also mention that the quoted products are brand new, are not in End of Life declared category list and support for supply of Spares for 5 years from the date of main supply

INTENT OF SPECIFICATION

2.01.01 This specification is intended to cover the design, manufacture, assembly, Inspection and testing at Bidder's works; delivery including packaging, crating in road / sea worthy packing, freight, insurance, all taxes & duties and other charges as applicable for the items and all accessories specified in the scope of supply and as required for safe and trouble free operation of CLOSE CIRCUIT TELEVISION (CCTV) SYSTEM, PERIMETER INTRUSION DETECTION SYSTEM, ACCESS CONTROL SYSTEM and PATROL GUARD SYSTEM.

2.01.02 All systems covered herein shall be for the permanent phase of the project and shall include but not be limited to; design, supply, supervision of interface installation Bidder's works, test, commission and hand over to owner the equipment.

2.01.03 It is not the intent to completely specify all details of design and construction herein. Nevertheless, the system shall conform to high standard of engineering, design and workmanship in all respects and shall be capable of performing satisfactorily in continuous commercial operation under the prevailing environmental condition of the project site.

2.01.04 ABBREVIATIONS

BOQ	- Bill of Quantities
CCB	- Central Control Building
CCTV	- Close Circuit Tele Vision
CCR	- Central Control Room
DCS	- Distributed Control System
DVSP	- Digital Voice Storage Playback
GCC	- General Conditions of Contract
LED	- Light Emitting Diode
LOI	- Letter Of Intent
MDF	- Main Distribution Frame
MTTR	- Mean Time To Repair
PC	- Personal Computer QAP - Quality Assurance Plan
RH	- Relative Humidity RMS - Root Mean Square
SPL	- Sound Pressure Level
UCR	- Utilities Control Room
UHF	- Ultra High Frequency
UPS	- Uninterruptible Power Supplies

2.02.00 SCOPE OF WORK AND EXCLUSIONS

2.02.00 **GENERAL**

2.02.01 The scope of work in this document specifies the technical & contractual requirements for the design, supply, erection, testing and commissioning of CCTV System, perimeter intruder detection system, Access Control system & Patrol Guard system and all accessories.

2.02.02 Bidder shall be fully responsible for compliance of the system to be supplied in line with the requirements of this specification.

2.02.03 Provisions included in the specification will not be limitative to the scope of work and bidder shall be responsible for supply, installation, erection, commissioning and handing over of complete system.

2.02.04 Bidder shall provide supply/services for any further activities which will improve the quality & performance of the system offered.

2.02.05 Tentative list of distribution of cameras are listed in the Annexure-1 of this specification for calculating total quantity of each type of camera in each project.

2.02.05 The plot plan of the project is enclosed as Annexure-2

2.02.06 INCLUSION IN SUPPLY: This system is for the entire BTG Plant and Balance of Plants (BOP) like Coal Handling Plant, Ash Handling Plant, Plant Water System, CW, ACW System etc and also along the plant boundary The scope of supply in this specification includes Design, fabrication, manufacture and assembly, inspection, shop testing at manufactures works, supply, transportation to site, site testing, erection and commissioning and performance testing of the entire CCTV Security System perimeter intruder detection system, Access Control system and patrol guard equipment as specified in this tender documents.

2.02.07 **SCOPE OF SERVICE**

Following service shall also be provided by Bidder for equipment & systems supplied under this specification:-

a) Carrying out detail engineering, preparation and submission of all drawings as specified elsewhere in this specification including preparation and submission of area wise bill of materials, layout and erection drawings showing location of all system equipment and components, cable schedule, cable tray/rack and conduit routing.

b) Inspection and testing at Bidder's works as per the approved Quality Assurance Plan.

c) **Packing and forwarding of all equipment (except cable drums, poles) included under this specification in a weather proof container with lock and key.** The bidder shall be responsible for safe storage of the items inside the container against weather. It shall be bidder's responsibility to take materials out of container for erection and commissioning of the systems.

d) Installation and Commissioning of the CCTV, perimeter intruder detection system, Access Control system and Patrol Guard system shall involve deploying labour (skilled and unskilled), supervisory personnel, engineer and also erection tools and tackles, testing equipment, consumables & hardware, transport and storage in container for timely and efficient execution of the contract work.

e) The erection, installation and commissioning of the complete CCTV system, perimeter intruder detection system, Access Control system will be in bidder scope of services except specific exclusion mentioned in the specification. This will include storage in weather proof container, fixing of camera using suitable camera mount (as per site requirement), all cable laying & termination, fixing of conduits/cable tray, installation and commissioning of all items supplied under CCTV system, perimeter intruder detection system, Access Control system on as required basis. The cables of the systems will be generally laid on the cable tray available in the plant. For end termination, the cable may be required to be laid inside conduits. Also, the FO and power cable along perimeter shall be laid 2feet underground (10000mtrs) perimeter cable for camera inside HDPE conduit. Underground cabling is also to be done where ever cable tray is not available.

g) Bidder will, during the time of detail engineering and installation of the quoted system, interact and coordinate with any other agency regarding collection/retrieval of inputs/information/data and all such works shall be under the scope of this Bidder. If necessary, Bidder shall contact the purchaser for clarifications before submission of their Bid.

h) Training to be provided to Owner's personnel for maintenance.

i) Establish the specified interfaces and demonstrate operation.

j) Site modification and preparation of "as-built" documentation".

k) Securing certification from relevant authorities, wherever applicable.

l) Project management and scheduling including micro-planning in specific work area and reporting progress periodically.

m) Bidder has to provide the services required for completeness and correctness of the system irrespective of whether it is mentioned in the specification or not.

n) The complete erection and commissioning of CCTV system, perimeter intruder detection system, Access Control system shall be done as per availability of fronts in the project and would have to be done spreading over a period of approximately 15months from delivery of the materials at site. The erection and commissioning would therefore require multiple visit to site for survey, planning, cable schedule preparation, laying of cables, camera mounting, sever installation and commissioning and camera commissioning and bidders should include the same in their offer for E&C.

o) Redundant 240 VAC UPS feeder from main plant UPS shall be provided at Security room at Service Building Ground floor for CCTV and Perimeter Intruder Detection System. Further distribution and conversion to other voltage level for complete CCTV and Perimeter Intruder Detection System shall be suitably done by Contractor.

2.02.08 EXCLUSIONS from scope of services:

Perimeter Intruder detection system and CCTV system

a) Lifting of CCTV 42U panel from stores to CCTV control room.

b) Laying of all cables between Camera's JB to CCTV panel (however termination is in bidder's scope)

c) Fixing / Mounting of all camera, 42" monitor, poles, Main Junction boxes, cable tray, conduits.

Access Control System

a) Fixing / mounting of card reader and lock, cable tray, conduits.

b) Laying of all cables between reader/controller to server (however termination is in bidder's scope)

2.03.00 PERFORMANCE GUARANTEE

2.03.01 The Systems / Equipment to be supplied under this specification shall meet the guaranteed performance specified in the enclosed data sheet, specification sheet and technical attachment sheet when operating at the rated / specified conditions. The acceptance of the System / Equipment shall be subject to satisfying these parameters during shop test at Bidder's works and / or at site installation in complete assembled condition.

2.04.00 REFERENCE DOCUMENTS' CODES AND STANDARDS

2.04.01 The entire system and accessories materials shall conform to the requirements of the latest issues and most recent revisions and amendments of the standards listed below and to the local laws and regulations applicable to the Project.

2.04.02 This Specification shall be read in conjunction with material Standards, codes, practices and regulations.

2.04.04 **GENERAL CODES AND STANDARDS**

2.04.04.01 Materials shall be designed, manufactured and tested in accordance with the latest applicable Indian Standards (IS), IEC and other internationally recognized standard except where modified and/or supplemented by this specification. Performance figures quoted shall be guaranteed within the tolerance permitted by relevant standards. In case of failure of the equipment to meet the guarantee, the equipment may be liable for rejection.

2.04.04.02 It shall be Bidder's responsibility to comply with the requirements of all Codes and Standards which are applicable to meet the Specification.

2.04.04.03 The following Codes and Standards form a part of the Specification:

ANSI : American National Standards Institute
BS : British Standards
CCITT : Consutative Committe on Telephone and Telegraph
EIA : Electronics Industry Association
FM : Factory Mutual
IEC : International Electrotechnical Commission
IEEE : Institute of Electrical and Electronic Engineering
IS : Indian Standard
ISA : Instrument Society of America
ISO : International Standards Organisation
ITU : International Telecommunication Union
NEC : National Electrical code
NEMA : National Electrical Manufacturers Association

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI S3.5 Methods for the Calculation of the Speech Intelligibility Index

BRITISH STANDARDS (BS)

1	BS EN 60268-5 : 2003	Sound system equipment, Loudspeakers.
2	BS EN 6840-13 : 1998	Sound system equipment. Listening tests on Loudspeakers.
3	BS 6840-14: 1987	Sound system equipment. Guide for circular and elliptical Loudspeakers; outer frame diameters and mounting dimensions.
4	BS 8473 :2006+A1:2008	Intruder and hold-up alarm systems. Management of false alarms. Code of practice.

INDIAN STANDARD (IS)

IS-5	Colour for ready mixed paints and enamels.
IS-694	PVC insulated cables for working voltages upto and including 1100 V.
IS-1554	PVC insulated electric cables.
IS-2147	Degree of protection provided by enclosures for low voltage switchgear and control gear.
IS-3961	Recommended current ratings for cables.
IS-3975	Mild steel wires, formed wires and tapes for armoring of cables.
IS-5831	PVC insulation and sheath of electric cables.

IS-7741	Specification for Loudspeakers.
IS-8130	Conductors for insulated electric cables and flexible cords.
IS-9302	Characteristics and methods of measurements for sound system equipment.
IS-9537	Conduits for electrical installations.
IS-10426	Specification for public address amplifiers.
IS-10918	Vented type nickel cadmium batteries.

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)

IEC 60268-5 Ed.3.1 EN:2007	Sound System Equipment – Part 5: loudspeakers.
IEC 60529	Classification of Degrees of Protection Provided by Enclosures (IP Code)
IEC 60839-5-2 ed. 1.0 b:1991	Alarm Systems Part 5 Requirements for alarm transmission systems.
IEC 61000	(All Parts) Electromagnetic Compatibility (EMC)

The edition or revision of the Codes and Standards shall be the edition current at the date of the Contract.

Following standards to be followed for Digital video recording and management system

1. ISO 9001 (2000)
2. ISO/IEC15504 Level3 or higher (SPICE 2.0 Software Process Improvement and Capability Determination)
3. SEICMM Level3 or higher (American Software Engineering Institute - Capability Maturity Model)

2.05.00 PROJECT INFORMATION

2.05.01 Environment specified as 'Indoor' shall be air-conditioned, where mentioned, having temperature between 20-25 degrees C and RH of about 40%. Outdoor location shall follow 'site condition' data.

2.05.02 All outdoor equipment shall be exposed to high humidity & oil/water vapor, coal dust and fly ash laden environment, vibration and electromagnetic interference generally encountered in similar industrial environment.

2.05.03 All outdoor equipment shall be mechanically or environmentally protect with sunshade or canopy wherever necessary.

Project Location:

Ennore: 2 x 660 MW Ennore SEZ Supercritical Thermal Power Project is coming up at Ash Dyke of North Chennai TPS in Vayalur Village, Near Ennore Port. North Chennai TPS is located at a distance of about 35 Kms from Chennai city. The proposed 2X660 MW unit shall be located on the Ash Dyke of North Chennai Thermal Power Station (NCTPS). The site is connected by all weather roads from Pattamandri on the Thiruvttiyur – Ponneri Dist., Highway. The NCTPS site is at a distance of about 05 kms from Ennore Port & Project site is well connected by a broad gauge railway siding and all weather approach road. The nearest Railway station is at Athipattu Pudunagar (approx 5 km). All weather road from Pattamandri on the Thiruvotriyur-Ponneri highway is the nearest road access. The nearest airport is at Chennai at a distance of 60 km.

North Chennai 1x800MW:
The 1X800MW Coal Based Super Critical Thermal Power Plant is coming up in the premises of existing NCTPS power plant at a distance of about 35 km from Chennai city. The site is connected by all-weather roads from Pattamandri on the Thiruvotriyur – Ponneri Highway. The NCTPS site is at a distance of about 05 km from Ennore Port & Project site is well connected by a broad gauge railway siding and all weather approach road. The nearest Railway station is at Athipattu Pudunagar (approx 5 km). All weather road from Pattamandri on the Thiruvotriyur-Ponneri highway is the nearest road access. The nearest airport is at Chennai at a distance of 60 km.

The Bidder shall acquaint himself by a visit to the site, if felt necessary, with the conditions prevailing at site before submission of the bid. All relevant site data /information as may be necessary shall have to be obtained /collected by the Bidder.

2.06.00 Technical specification of Accessories

a) **Information Outlet (I/O) of CAT-6 UTP**
Information outlet shall be RJ45 Toolless Infomation Outlet of CAT-6 UTP with white colour RJ-45 transparent shuttered socket outlets (modular) with all accessories including label holder, both side colour marking as per EIA/TIA standards. conformity of standards like ISO/IEC ed. 2, EN 50173 and EIA/TIA 568 for fast connection socket and it takes fast tool-less connectors with contact marking by double colour code 568A and B and numbers connectors with insulation displacement contact (IDC). It has the possibility of min. 5 times re-wiring in the event of error, multidirectional cable entry.

b) **Face Plate (Plastic Modular Face Plate white in Colour 1 Module)**
Face Plate shall be white modular plate type front plate with accessories for 1/2 nos RJ 45 data outlet, but excluding RJ45 data outlet complete in all respect with grid plate, screws, MS box etc with connections as required.

c) **Rack End Patch Cord-1 mtr Blue in Colour**
The Patch Cord shall be of CAT6 UTP PATCH CORD - 1 MTR (3 feet) Blue Colour factory moulded as per EIA/TIA standrads.

d) **End User Site Patch Cord-2 mtr Blue in Colour**
End User Site Patch Cord shall be of CAT6 UTP LSC2 PATCH CORD - 2 MTR (7 feet) Blue Colour factory moulded as per EIA/TIA standrads.

e) **19" rackmountable 24 Port CAT6 UTP Patch Panel Loaded**
This item shall be 24 port PATCH PANEL RJ-45 Loaded CAT-6 UTP 19" rackmountable patch panel preferbaly with front loaded 6 in a blocks as per EIA/TIA standrads, modular in mechanism.

f) **9U cabinet 504.65X600X500 (HXWXD) - Wall Mounting Rack**
9U cabinet shall be of Width (mm)-600, Depth (mm) - 500, Approx.Net Wt (kg) - 20, CRCA 'D' Grade thickness (mm) - 1.2, Powder Colour for Cabinet - RAL9002, Glass - 4mm Toughened Tinted Glass Door, Accessories:, Cooling Fan (230V A/C 90 CFM) - 2 Nos, PDU

230VAC - 1 No, Cable Manager Metal- 2 Nos, Mounting Hardware (20 sets of M6 screws,washer,cage nuts (nickel coated)) - 1 No, Wall Screws (4 sets of 2'' screws, washer, rubber grommet (nickel coated)) - 1 No, Door Lock - 1 No, Front Metal Band -1 No. In the rack there must be maintained 1U = 1.75 inches space. (All Stand alone rack and server should have 6A, 220V socket link with UPS line)

g) **Splicing Tray**

It shall be Modular Splice Tray Cassette for pigtails 12 fibre capacity.

h) **19" LCS2 Modular Liu-Fiber Optic Drawer-24 Port**

The item shall be Modular fiber optic drawer modular 19"(LIU) 24 port - FIBER OPTIC DRAWER loaded with SC Pigtail - 9/125 µm for 6 Cr. OFC armoured LCS2 and adapter for 6 OFC SM LCS2 without Blanking plate. The LIU should either be suitable for outdoor mounting/fixing or suitable enclosure for outdoor mounting to be provided

i) **HDPE pipe**

The HDPE pipe shall be used for laying OFC and STP cables in outdoor environment. HDPE pipe shall be permanently lubricated type with ISI marked. The internal diameter of the HDPE pipe shall be suitably selected so that 50% free space is maintained during cable drawing. The pipe shall conform to DOT standard GR/CDS-08/02 Nov. 2004 with latest

j) RIGID STEEL CONDUIT

Conduits up to and including 25 mm shall be of 16 SWG and conduits above 25 mm shall be of 14 SWG. Minimum size of conduits shall be 19 mm.Each piece of conduit shall be straight, free from blister and other defects and covered with capped bushing at both ends. All rigid conduit couplings and elbows shall be hot dip galvanized rigid mild steel in accordance with IS:9537 Part-I (1980) and Part-II(1981). The conduit interior and exterior surfaces shall have a continuous zinc coating with an over coat of transparent enamel lacker or zinc chromate. Conduits shall be furnished in standard length of 3 meters, threaded at both ends. All rigid conduit fittings shall conform to requirements of IS:2667,1976. Galvanised steel fittings shall be used with steel conduit. All flexible conduit fittings shall be liquid tight, galvanized steel. The end fitting shall be compatible with the flexible conduit supplied.

k) **SPECIAL FITTINGS**

All rigid conduit fittings shall conform to requirements of IS: 2667, 1976. Galvanised steel fittings shall be used with steel conduit. All flexible conduit fittings shall be liquid tight, galvanized steel. The end fitting shall be compatible with the flexible conduit supplied.

2.07.03.00 **DRAWING/ DOCUMENT SUBMISSION REQUIREMENTS**

2.07.03.01 Bid shall contain at least the following documents:

SL. NO.	DOCUMENT TYPE
1.	Supply Document list
2.	Supply program
3	Data sheets

4.	Technical specifications & relevant drawings
5.	Start-up, Mandatory and Recommended spare parts
6.	List of Tools and Tackle
7.	Proposed System schematic diagram.
8.	Write up on architecture and operation of proposed system
9.	BILL OF MATERIALS with make and model no. of equipment
10.	Power requirement (capacity of FCBC and SMF battery)
11.	Quality Control Plan
12	Declaration stating the quoted products are brand new, Products are not in End of Life category list, Spares availability for 5 years from the date of main supply
13	Clause wise technical compliance indicating each parameter value of w.r.t specification. A printout of this specification may be taken and "COMPLIED" to be mentioned against each clause with signature and seal on each page. Any deviation should be marked up at relevant clause.

2.07.04 **AS-BUILT DRAWINGS**

Upon completion of the final acceptance of the System by Owner, all construction drawings shall be updated by Bidder to an as-built status to reflect the equipment and System configurations as actually installed.

2.08.00.00 TESTING

2.08.01.00**FACTORY ACCEPTANCE TEST (FAT)**

2.08.01.01 Factory Acceptance Test procedure shall be prepared by Bidder along with Quality Assurance Plan. The document shall be subject to Owner's approval.

2.08.01.02 All System equipment shall be tested in the bidder's works prior to clearance for shipping. The FAT shall include individual equipment tests and integrated under fully assembled condition.

2.08.01.03 The FAT shall demonstrate adherence that the equipment meets the design standards and functional compliance.

2.08.01.04 One (1) month prior to the FAT, Bidder shall submit a test procedure to Owner for approval. Duration of FAT at manufacturer's works shall be atleast two weeks.

2.08.01.05 BHEL's representative will attend the FAT along with user / consultant representative.

2.08.01.06 Factory Acceptance Tests (FATs) shall be documented with the results obtained and the success or failure of the test. The test results shall be submitted to Owner prior to clearance of the FAT and authority by Owner is given to ship.

2.09.01.01**COMMISSIONING**

2.09.01.01 Bidder is responsible for delivering a fully functional equipment that meets all the requirements of the Specification and applicable standards.

2.09.01.02 The Commissioning processes will demonstrate the above to Owner, before handing over of the System.

2.09.01.03 System Commissioning shall comprise of a number of different activities culminating in the acceptance of the operational System by Owner. These activities are detailed in the following sections.

2.09.01.04 Bidder shall provide all necessary test equipment required to carry out the Commissioning and acceptance testing.

2.09.02 **SITE ACCEPTANCE TEST (SAT)**

2.09.02.01 Site acceptance test shall be performed by Bidder to verify the full operational functionality of the System.

2.09.02.02 Four weeks prior to the SAT Bidder shall submit a test procedure to Owner for approval.

2.09.02.03 All SAT tests shall be documented with the results obtained and their success or failure. These test results shall be submitted to Owner prior to clearance of the SAT and proceeding to the

2.10.01.00 CLEANING, PROTECTION AND PAINTING

2.10.01.01 All equipment shall be shipped in properly cleaned condition. All the equipment shall be thoroughly cleaned to remove mill scales, rust etc. and properly painted with anti rust primer, where applicable

2.10.01.02 Some of the equipment and accessories, after arrival at site, are likely to be in storage for long periods before they are taken up for erection. Bidder may provide adequate protection for preventing damage due to corrosion, dust / dirt ingress, ageing etc.

2.10.01.03 Plugs shall be provided at cable entry holes/adapters to avoid entry of dust and foreign particles. Paper cap will not be acceptable.

2.11.00 IDENTIFICATION, MARKING, PACKING AND STORING

2.11.01 Each equipment shall be individually packed, tagged and protected.

2.11.02 Inscription on equipment (labels) shall be in English.

2.11.03 Packing must be such to protect all goods from possible impacts and foreign matters; moreover, it must limit the influence of both the climate and the environment, and be suitable for the kind of shipping provided for.

2.11.04 In packing the equipment and accessories, all necessary precautions will have to be taken to avoid any damage during transport and delivery.

2.11.05 All items supplied shall be packed for long term storage under the climatic conditions prevailing at the site in a weather proof container. Small items shall be packed in sealed transparent plastic bags with desiccator packs as necessary. Each item shall be clearly marked with its description, purpose and plant designation code as applicable. When more than one item is packed in a single case a general description of the contents is to be shown on the outside of each case and a detailed list enclosed. All cases and other packages must be suitably marked and numbered for identification purposes.

2.12.00 SHIPMENT

2.12.01 Bidder shall be responsible for ensuring that all equipment are carefully and/or suitably packed for shipment, so that they arrive at site in good condition and remain so during storage at site. Before despatch, all exposed surface shall be protected by applying anti rust primer (two coats) and suitable cover shall be provided for the equipment to be supplied.

2.12.02 Bidder will be responsible for all damages due to improper preparation of the goods for shipment

2.13.00 DISCREPANCIES

In case of discrepancies between the technical requirements and other applicable Engineering Standards, Materials System Specifications, Standard Drawings, or industry standards, codes, and forms shall be resolved in writing by Bidder with Purchase. Before starting the manufacturing / supply, Bidder shall inform Purchase of any discrepancy between the instructions of the present specification and Bidder's standard. Bidder is also advised to discuss on any clarification required before submitting their offer to avoid any ambiguity/dispute later on.

It shall be the responsibility of Bidder to determine and comply with the statutory regulation (i.e. city, state, national, provincial, etc. codes or ordinances) which will apply in the location where the item is to be installed. Mandatory regulations cannot be superseded by this specification.

In case of any discrepancy in specification / parameter mentioned in this purchase specification, the specification/parameter mentioned in project specific technical specification provided at Annexure-I shall be considered and offered and offered.

16.00.00 GENERAL TERMS AND CONDITIONS

a. Considering possibilities of change in requirement, i.e. addition & deletion of quantities for individual project BOM at a later date after system design finalization, the bidder must clearly quote unit price as well as lot price for all items for indisputable calculations of lot prices in case of revised quantities later. Each item is to be offered on per unit basis including commissioning spares, cables, type test charges etc.

b. In case of quantity change, unit rates shall be applicable.

17.00.00 Bill of materials: ENNORE- 2x660MW

SL.	ITEM DESCRIPTION	TOTAL QUANTITY
	Perimeter Intrusion detection system and CCTV system- BOM	
1.a	Redundant Database video Management Server with capacity to control 256nos of camera with 29" monitor, mouse, keyboard & other required accessories	2 Sets
1.b	Camera server (similar configuration as Database server) with video storage capacity	9 sets
2.	Alarm and Display Monitors as per Cl 17.03.01 of Annexure-I	1 Lot
3.	Client Work Station with 22" monitor, keyboard & mouse with PTZ control units and necessary software licenses.	6 Set
4.	Digital Video Management Software and Video Analytic software (to be installed in each server)	1 Set
5.	DVD/Memory storage device to store video of all camera for at least 1 year	1 lot
6.	PTZ cameras with housing and other accessories (as per technical specification)	293 nos

7.	Explosion Proof PTZ camera	2 nos
8.a	Industrial grade Distribution Switch of suitable number of SFP and Cu ports for various locations with 20% spare ports	1 lot
8.b	Industrial grade Router / L3 Switch	1 No
9.	Industrial grade L2 Field (edge) network switches	50 nos
10.	42U panel for housing the server, network switch etc in security room	1 lot
11.	6 core Single mode armoured OFC cable	32000 mtrs
12.	Twisted 4 pair STP CAT6 cable and connectors	12000 mtrs
13.	3C 1.5Sqmm un-armoured power cable for connection between camera JB to camera	3000 mtrs
14.	3C 1.5Sqmm Armoured power cable	28000 mtrs
15.	Passive Fiber Optic Components and termination kit consisting of .Fiber panel, Information outlet, Cabinets, LIU, face plates, SC Coupler, Fiber Optic Drawer with Pigtail, UTP CAT6 Patch cords, various connectors, cable ties, Multi strand Copper wire for grounding of equipment.	As Required
16.	25mm PVC Conduit with coupler and other accessories between JB to camera	3500 mtrs
17.	Permanently lubricated HDPE PIPE of suitable cross section with coupler and other accessories for routing Power & FO cable in power plant	25000 mtrs
18.	Earthing system (cables etc) for Servers and for cameras	As required
19.	Power distribution boards for distributing power supplied to camera from UPS/CCTV Panel/PDB	As required
20.	6mtrs GI Poles suitable for mounting Camera and related JB etc	40nos
21.	NMS System for IP backbone network with software and hardware	1 set
22.	Any other supply item not covered above but required for completion of the system	1 set
23.	Mini UPS of 1KVA rating or as required for connecting 5-6 cameras, 1 switch and 3-4 media converters	20 nos
24.	Any other item mentioned in technical specification and not in this BOM	1 lot
25.	Training charges	1 set
26.	Engineering, Design, Documentation, Testing, Erection, installation & commissioning	1 set
	Access Control System- BOM	
1.	Redundant server with 32” monitor, mouse, keyboard & other required accessories and access control software suitable for 1500 cards	1 Set
2.	Work Station with 29” monitor, keyboard & mouse, necessary software & A4 printer	1 Set
5.	HID card reader with electromagnetic door locks	50 Nos.
7.	Access card	1000nos
8.	Access card controller	As reqd

9.	ID card printer with web camera	2nos
10.	Armoured Data cable of suitable number of core and cross section between Access Door to controller	1000mtrs
11.	Armoured Power cable 3C 2.5Sqmm	4000mtrs
12.	4F / 6F OFC Cable	5000mtrs
13.	All other accessories including FO accessories for establishing connection between various card readers and controller as required to complete the system	As required
14.	25mm PVC Conduit with coupler and other accessories between JB to camera	500 mtrs
15.	Permanently lubricated HDPE PIPE of suitable cross section with coupler and other accessories for routing Power & FO cable underground in power plant	500 mtrs
16.	Any other supply item not covered above but required for completion of the system (Bidder to mention the items clearly in their offer)	1 set
17.	Any other item mentioned in technical specification and not covered above	1 set
18.	Training charges	1 set
19.	Engineering, Design, Documentation, Testing, Erection, installation & commissioning	1 set
	PATROL GUARD SYSTEM - BOM	
1.	Patrol Guard PC, mouse, keyboard with all accessories at Central Control Room.	1 Set.
2.	Patrol Guard Card Reader with rechargeable battery and charger	100 Nos.
3.	Patrol Guard Data Collection and transfer unit	10 Nos.
4.	Data Transfer cable with connector	1 set
5.	Patrol Guard Software	1 Set
5.	Any other supply item not covered above required for completion of Patrol Guard system (mention the items with unit rate of each item)	1 set
6.	Engineering, design, documentation, testing, Erection, installation & commissioning of complete patrol guard monitoring system	1 set

	Common Items for all above systems	
1.	Weather proof Storage container (with lock and key arrangement) of adequate dimension for storing electronic items supplied for CCTV / Patrol Guard system.	As required
2.	Mandatory spares as per list below	1 set

As per Recommendation for Three Operation or minimum quantities below, whichever is more. Letter from OEM to be submitted mentioning the recommendation

Electronic cards	Nos.	One No. of each type
PTZ controller	Nos.	One No. of each type
Electronic modules used for server system	Nos.	10% or Two No. of each type

		(whichever is more)
Special cables & connector	Set	(5 sets) of each type
Cartridges for air filter	Nos.	Two No. of each type
Relay	Nos.	5 nos. of each type
Power supply modules of each type	Nos.	5 nos. of each type
Camera of each type	Nos.	Two no. of each type
: Automatic door sensors	Nos.	10% or 2 nos. min whichever is more
Card reader.	Nos.	10% or 2 nos. min whichever is more

Notes: 1. Th

Bill of materials: NORTH CHENNAI - 1x800MW

SL.	ITEM DESCRIPTION	TOTAL QUANTITY
	Perimeter Intrusion detection system and CCTV system- BOM	
1.a	Redundant Database video Management Server with capacity to control 256nos of camera with 29" monitor, mouse, keyboard & other required accessories	2 Sets
1.b	Camera server (similar configuration as Database server) with video storage capacity	9 sets
2.	Alarm and Display Monitors as per Cl 17.03.01 of Annexure-I	1 Lot
3.	Client Work Station with 22" monitor, keyboard & mouse with PTZ control units and necessary software licenses.	6 Set
4.	Digital Video Management Software and Video Analytic software (to be installed in each server)	1 Set
5.	DVD/Memory storage device to store video of all camera for at least 1 year	1 lot
6.	PTZ cameras with housing and other accessories (as per technical specification)	184 nos
7.	Explosion Proof PTZ camera	2 nos
8.a	Industrial grade Distribution Switch of suitable number of SFP and Cu ports for various locations with 20% spare ports	1 lot
8.b	Industrial grade Router / L3 Switch	1 No
9.	Industrial grade L2 Field (edge) network switches	35 nos
10.	42U panel for housing the server, network switch etc in security room	1 lot
11.	6 core Single mode armoured OFC cable	25000 mtrs
12.	Twisted 4 pair STP CAT6 cable and connectors	7500 mtrs
13.	3C 1.5Sqmm un-armoured power cable for connection between camera JB to camera	2500 mtrs
14.	3C 1.5Sqmm Armoured power cable	22000 mtrs
15.	Passive Fiber Optic Components and termination kit consisting of .Fiber panel, Information outlet, Cabinets, LIU, face plates, SC Coupler, Fiber Optic Drawer with Pigtail, UTP CAT6 Patch cords, various connectors, cable ties, Multi strand Copper wire for grounding of equipment.	As Required

16.	25mm PVC Conduit with coupler and other accessories between JB to camera	3000 mtrs
17.	Permanently lubricated HDPE PIPE of suitable cross section with coupler and other accessories for routing Power & FO cable in power plant	20000 mtrs
18.	Earthing system (cables etc) for Servers and for cameras	As required
19.	Power distribution boards for distributing power supplied to camera from UPS/CCTV Panel/PDB	As required
20.	6mtrs GI Poles suitable for mounting Camera and related JB etc	30nos
21.	NMS System for IP backbone network with software and hardware	1 set
22.	Any other supply item not covered above but required for completion of the system	1 set
23.	Mini UPS of 1KVA rating or as required for connecting 5-6 cameras, 1 switch and 3-4 media converters	15 nos
24.	Any other item mentioned in technical specification and not in this BOM	1 lot
25.	Training charges	1 set
26.	Engineering, Design, Documentation, Testing, Erection, installation & commissioning	1 set
	Access Control System- BOM	
1.	Redundant server with 32” monitor, mouse, keyboard & other required accessories and access control software suitable for 1500 cards	1 Set
2.	Work Station with 29” monitor, keyboard & mouse, necessary software & A4 printer	1 Set
5.	HID card reader with electromagnetic door locks	50 Nos.
7.	Access card	1000nos
8.	Access card controller	As reqd
9.	ID card printer with web camera	2nos
10.	Armoured Data cable of suitable number of core and cross section between Access Door to controller	1000mtrs
11.	Armoured Power cable 3C 2.5Sqmm	4000mtrs
12.	4F / 6F OFC Cable	5000mtrs
13.	All other accessories including FO accessories for establishing connection between various card readers and controller as required to complete the system	As required
14.	25mm PVC Conduit with coupler and other accessories between JB to camera	500 mtrs
15.	Permanently lubricated HDPE PIPE of suitable cross section with coupler and other accessories for routing Power & FO cable underground in power plant	500 mtrs
16.	Any other supply item not covered above but required for completion of the system (Bidder to mention the items clearly in their offer)	1 set
17.	Any other item mentioned in technical specification and not covered above	1 set
18.	Training charges	1 set

19.	Engineering, Design, Documentation, Testing, Erection, installation & commissioning	1 set
	PATROL GUARD SYSTEM - BOM	
1.	Patrol Guard PC, mouse, keyboard with all accessories at Central Control Room.	1 Set.
2.	Patrol Guard Card Reader with rechargeable battery and charger	100 Nos.
3.	Patrol Guard Data Collection and transfer unit	10 Nos.
4.	Data Transfer cable with connector	1 set
5.	Patrol Guard Software	1 Set
5.	Any other supply item not covered above required for completion of Patrol Guard system (mention the items with unit rate of each item)	1 set
6.	Engineering, design, documentation, testing, Erection, installation & commissioning of complete patrol guard monitoring system	1 set

	Common Items for all above systems	
1.	Weather proof Storage container (with lock and key arrangement) of adequate dimension for storing electronic items supplied for CCTV / Patrol Guard system.	As required
2.	Mandatory spares as per list below	1 set

As per Recommendation for Three Operation or minimum quantities below, whichever is more. Letter from OEM to be submitted mentioning the recommendation		
Electronic cards	Nos.	One No. of each type
PTZ controller	Nos.	One No. of each type
Electronic modules used for server system	Nos.	10% or Two No. of each type (whichever is more)
Special cables & connector	Set	(5 sets) of each type
Cartridges for air filter	Nos.	Two No. of each type
Relay	Nos.	5 nos. of each type
Power supply modules of each type	Nos.	5 nos. of each type
Camera of each type	Nos.	Two no. of each type
Automatic door sensors	Nos.	10% or 2 nos. min whichever is more
Card reader.	Nos.	10% or 2 nos. min whichever is more

1. The above bill of quantities is tentative. Bidders are requested to refer to the drawing and document and quote for complete system, including any item not specifically mentioned in the BOQ.
2. The Bidder should clearly provide make and model number for each item in BOM provided above.

Project specific technical specification of PSS for Ennore project

PLANT SECURITY AND SURVEILLANCE SYSTEM

17.00.00 PLANT SECURITY AND SURVEILLANCE SYSTEM

17.01.00 General Requirements

17.01.01 A complete integrated plant security and surveillance system complete with all hardware and software as required shall be provided. The system to be provided shall include all necessary hardware, software, firmware, interfaces and accessories, all related civil and masonry work required for implementing a fully functional plant security and surveillance system for a modern power generation utility. Bidder's offered plant security and surveillance shall include complete hardware & software as per actual additional requirement, but not limited to the details specified in subsequent paragraphs.

17.01.02 The intent of the specification is to define the functional & design requirements for the Perimeter Intruder Detection System and CCTV System meant for gathering video information from the various perimeter & operational areas of the power plant. ~~The Perimeter Intruder Detection System and CCTV should seamlessly integrate with Bidder supplied DDCMIS~~. The Bidder shall be responsible for selection, design, engineering, manufacture, testing at manufacturer's works/site, installation and commissioning of the system to the satisfaction of Owner. All the cables, cable trays, power packs, erection hardwares etc. are also included in bidder's scope.

17.01.03 The Bidder's scope shall also include successful demonstration of cable trays, junction boxes, earth wire and accessories like standard brackets, nut-bolts, glands, lugs, conduit sleeves, etc., as required, to complete the proper installation conforming to IS:1881, IS:1882 of all the equipments supplied as covered in this specification. All equipment, accessories and facilities required for completeness of this system shall be furnished by the Bidder within the quoted price, whether these are specifically mentioned herein or not.

17.01.04 The CCTV System offered by the Bidder shall be from reputed manufacturer who should have designed, manufactured, tested and commissioned a distributed type CCTV systems as specified in thermal power plants or large industrial installation as on the date of bid opening.

17.01.05 The system and all the equipment shall conform to the latest edition of India / International and CCITT standards as applicable.

17.01.06 The Bidder shall guarantee satisfactory performance of the equipment under stipulated variations of voltage and frequency. The design and manufacture shall be such that equipments/components of same type and rating shall be interchangeable.

17.01.07 The design of the plant security & surveillance system shall take into account the potential security risks to the power plant. Plant security and surveillance system shall be an integrated system comprising the following systems/facilities:

(a) Perimeter Intruder Detection System

(b) CCTV Monitoring of Plant area/ equipments.

(c) Security card accessing system.

(d) Patrol Guard System.

17.02.00 POWER SUPPLY ARRANGEMENT

17.02.01 2 nos. of feeders 415 V shall be taken by the bidder from the respective LT Switchgear nearby the consumers. Further the Bidder shall provide Suitable arrangement with changeover circuitry, transformer for powering CCTV System from separate industrial grade parallel redudnat UPS system with NiCd fiber plated battery (1 hour backup) for camera servers, digital video management servers, OS in the security room and control room as well as for cameras to be located in the main plant area. If the offered equipment is operating at voltage level other than available in plant, the Bidder shall provide all required hardware, within lump sum quoted price to make the offered system compatible with specified power supply arrangement. UPS shall be provided with same features as specified elsewhere in specification. All type of cables required for Plant security and surveillance system shall be in bidder scope.

17.03.00 DESIGN AND TECHNICAL REQUIREMENTS

17.03.01 For the purpose of perimeter detection and CCTV monitoring, a security room shall be provided in the Time Office. This room will house servers, OS, Network controllers, Multiplexers, Video recorders, monitors, PTZ units and other associated accessories. CCTV control room & redundant data base video management server & camera server room shall be air-conditioned room.

All cameras for perimeter detection system and CCTV system shall be connected to suitably located RTUs (Remote Terminal Units) in groups through multiple mode armored "Fibre Optic cable or UTP cables" for transferring camera video signals. RTUs will then be connected to a network controller which will sit on separate CCTV specific plant/Station LAN. Network controllers shall be capable of accommodating number of RTUs. GI conduit pipes shall also be provided by bidder, wherever required.

RTUs shall be suitable for accepting different types of field devices e.g fixed cameras, dome cameras, card access readers etc.

All camera images shall be continuously recorded. System offered shall allow to record and hold camera images for a minimum period of 30 days. Facility for transferring camera images to separate recorders/ data storage devices and play back facility of the same shall be provided. Bidder shall also provide data storage devices to store the backup data for one year.

Camera image monitoring and viewing facility shall be provided at Time Office's security room, CHP control room, AHP control room, DM plant control room, station inchage room, Chief engineer room and at CCR. While from CCR, AHP

control room, DM plant control room, station inchage room, Chief engineer room & CHP control room, only CCTV monitoring will be carried out, both perimeter detection and CCTV viewing shall be possible from security room.

Alarm & Display monitors shall be provided as follows:

(a) 2 nos Operating Stations (OS) with PTZ controller each at Security room in Time Office for each with A4 sized colored LJP of Perimeter Monitoring & CCTV.
(b) 2 no. ≥ 32" diagonal sized full HD LED TV each of latest version with advanced features at main security office to show the real time images for CCTV system & perimeter intruder detection system respectively.
(c) Four (4) no. 40" LED TV/monitor each with work station grade controller & PTZ controller, keyboard, mouse / track ball at CCR for CCTV monitoring. These LED TVs shall be installed and hanging from the false ceiling of the Central control room. Out of Four LED TV/monitor, one shall be unit 1, second shall be for unit 2 and other two nos. shall be for common plant packages.
(d) One (1) no. 32" LED TV/monitor each with work station grade controller & PTZ controller, keyboard, mouse / track ball at CHP control room for CCTV monitoring.
(e) One (1) no. 32" LED TV/monitor each with work station grade controller & PTZ controller, keyboard, mouse / track ball at AHP control room for CCTV monitoring.
(f) One (1) no. 32" LED TV/monitor each with work station grade controller & PTZ controller, keyboard, mouse / track ball at DM plant control room for CCTV monitoring.
(g) One (1) no. 32" LED TV/monitor each with work station grade controller & PTZ controller, keyboard, mouse / track ball at Chief Enginner room for CCTV monitoring.
(h) One (1) no. 32" LED TV/monitor each with work station grade controller & PTZ controller, keyboard, mouse / track ball at Station Incharge room for CCTV monitoring.

17.03.02 Perimeter Intruder Detection System

Perimeter intruder detection system shall meet following requirements:

(a) The detection system shall be installed along the entire length of fence/ boundary of the power plant and all entry& exit gates on the boundary. The system shall be capable of providing 24 hour continuous surveillance by means of a network of video cameras.
(b) The intruder detection system shall be based on video motion detection technology.
c) The system shall be able to identify and distinguish between whether the intruder is a human being or an animal.
(d) Upon detection of intrusion, suitable alarms to be raised to security guards and corresponding camera image shall be displayed on a high resolution dedicated alarm screen.
(e) The system shall allow for the adjusting the sensitivity to reduce false

alarms.

(f) When there is no intrusion, the camera images shall be displayed and recorded on a multiplexed basis.

(g) As many cameras as required for proper coverage of total perimeter length shall be provided. However, individual camera coverage shall not exceed 200 meter distance along the perimeter length.

17.03.03 The Perimeter intruder detection system and CCTV system shall be able to provide surveillance of different locations the plant. The different areas to be viewed are indicated at the end of this chapter and the controls for each units are to be provided in the Control Room. Bidder to note that the locations indicated in this sub-section are tentative only. The exact locations shall be decided during detailed engineering for the various operational areas of the power plant.

17.03.04 The system shall comprise of Redundant Digital Video Management Server System capable of controlling 256 nos. of Cameras for Zoom, Pan/Tilt, Multiple pre position and auxiliaries, suitable number of camera servers for common areas for controlling both manually and automatic and all other accessories required to provide best quality video with controls for making the system complete. The Redundant Digital Video Management Server System for perimeter intruder system shall be similar to the same hardware and operating system configuration of database server envisaged for CCTV package.

17.03.05 The system operation would be of covering the complete view of the areas with pan / tilt, zoom, propositioning of the cameras and with programmability to monitor any camera on any monitor either manually or automatically in a defined switching. The system shall be suitable for installation and shall be able to work successfully in Thermal power plant environment.

17.03.06 The system shall have the following facilities:

(a) Zooming
(b) Pan control
(c) Tilt control
(d) Computer interface
(e) Logging printer part
(f) Multiple prepositions
(g) Programmability
(h) Alarm interface

The Bidder shall indicate details of the video and controls in his proposal.

17.03.07 The system supplied shall be complete in all respects for reliable performance. The Bidder shall submit the details block schematic, video, signal & power wiring diagram, describing the connections between the Camera's, streamers, digital video management server & camera server. Programming required shall be done by the Bidder for satisfactory operation.

17.03.08 ~~The CCTV system shall be seamlessly integrated with DDCMIS system software for alarm transfers with pot. Free contacts.~~

17.04.00 **DETAILED DESCRIPTION OF THE SYSTEM COMPONENTS:**

17.04.01 **The CCTV system shall have digital video recording facility as well as data management facility at suitable independent location. Bidder shall provide suitable digital video recording & management system (DVRMS) for this purpose.**

17.04.02 The Digital Video Recording & Management System shall include:

i. Redundant Database Servers
ii. Camera Servers
iii. Security or Control Systems
iv. Operator Stations
v. Network connected cameras ~~and/or network connected camera streamers~~
vi. Network infrastructure

17.04.03 **Redundant Database Servers**

17.04.03.01 The Database Server contains a database of all network-connected cameras and their configuration.

17.04.03.02 The Database Server shall:

a. Manage the system database, containing details including
   i. System configuration
   ii. Camera configuration and settings
   iii. Recording configuration and settings
   iv. Configuration of Quad Views and Sequences
   v. Details of recordings
   vi. Schedules
   vii. Operator security details
   viii. Configuration of Surveillance and Alarm Monitors
   ix. Configuration of Video Analytics

b. Manage communication between the Operator Stations and the Camera Servers
c. Video Motion Detection
d. Allow alarms/events in the Security System or Control System to initiate recordings
e. Report any camera failures or recording failures to the integrated Control system or Security system
f. Provide a full audit log of all system status (camera, streamer, server availability) and operator actions.

17.04.03.03 The Database Server shall be able to be use in a redundant configuration, using two separate Database Servers (being executed on separate Work stations). The backup Database Server shall be continuously synchronized with the master Database Server to ensure that it is always up-to-date and ready for a fail-over, when required.

17.04.03.04 The DVRMS must be capable of running a pair of similarly configured computers in a hot backup configuration where at any point in time, one is the acting Primary and the other is acting as the Hot Backup. An on-line database duplication mechanism must be supported.

17.04.03.05 Simply having each Database Server scan each Camera Sever, or requiring the Camera Servers send all updates to both Database Servers is not acceptable. The database duplication must be performed on a per-transaction basis for two reasons:

i. To ensure that the duplicated Backup database is consistent at all times with the Primary database
ii. To avoid unnecessary loading of Camera Servers caused by duplicate polling
iii. It must be possible to remove one of the redundant systems for maintenance without interrupting operation, and upon its reinstatement, re-synchronize the databases, again without interruption to system operation.

17.04.03.06 The Database Server (RAID 5 grade) shall be able to operate with no performance degradation using the following hardware and operating system configuration:

i. Intel Xeon Quad (4) Core 64 bit Processor capable 3.6 GHz with 16MB L3 cache memory per processor
ii. 16 GB RAM
iii. Hard Disk storage of 1000 GB min. It shall be as per system requirements.
iv. 100/1000 Mbps NIC for network connection to the other components of the DVRMS
v. Graphics card supporting 24-bit colour and with 64 MB video RAM if the Database Server is also used as a client station
vi. Windows 2003 Server (SP1), Windows 2000 Server (SP4), Windows XP Professional (SP2) or Windows 2000 Professional(SP4)
vii. Microsoft SQL Server 2000 with Service Pack 4
viii. Microsoft Internet Explorer 8.0 with Service Pack 1 or higher
ix. Application software
x. Dual hot plug power supplies
xi. Dual Hot plug fans
xii. 29" LED Monitors with 1920 x 1080 pixel resolutions & 178 deg V/H viewing angle.

17.04.04 Camera Servers

17.04.04.01 The Camera Server(s) must be capable of supporting a large amount of disk space for online video storage and access to high capacity archiving mechanisms for the removal of stored video to off-line media.

17.04.04.02 The Camera Server shall:

1) Manage live video from camera streamers
2) Transmit live video to Operator Stations
3) Receive camera control commands from Operator Stations and then send the commands to cameras
4) Store live video to hard disk

5) Transmit previously stored video to Operator Stations
6) Archive previously stored video to off-line storage media
7) Retrieve archived video from off-line storage media
8) Provide Video Analytics including:
9) Video Motion Detection
10) Export the recordings into MPEG format so that it can be viewed using standard tools including Microsoft's Video Player.

The Camera Servers shall rely on the Database Server for all camera database information. Proprietary hardware platforms are not acceptable.

17.04.04.03 The Camera Server shall be able to operate with no performance degradation using the same hardware and operating system configuration of database server.

17.04.05
i. Configuration of Operating stations shall be same as specified at cl. No. 4.03.03.04 with 29" sized LED monitors.
ii. Memory of database & camera server is minimum as specified above, memory shall be suitable to have 1 month recording in server. Further DVD/Memory storage device shall be provided by bidder for past data storage of min one year for retrieval.
iii. Server shall be rack mounted.
iv. The server/OWS processor shall be latest and got approved from owner at the time of supply.
v. The Operating system shall be latest at the time of supply.

17.04.06 APPLICATION SOFTWARE FUNCTIONS

a) **Live Video**
i. The live output from cameras shall be viewed through a series of displays.
ii. These shall support:

1. Single camera view
2. Quad view of up to four cameras
3. Sequence view of camera preset positions
4. Modifying settings for a camera
5. Modify recording settings for a camera
6. Adding and deleting cameras
7. Creating schedules for recordings and video motion detection
8. Modifying Video Analytics settings and tuning for video Motion Detection

Users shall be able to select a camera from a tree control listing the cameras available to the user.

iii. The system shall also support multiple monitors in the following way:

1. **Alarm monitor:** When an alarm occurs in the Security or Control System Server, the live video output of the camera associated with that alarm shall be switched directly to an alarm monitor. The user

shall be able to acknowledge the alarm to clear the monitor using the numeric keypad. Cameras that are directed to alarm monitors will not be removed from the queue unless explicitly cleared by the operator. It shall be possible to create a queue of alarm monitors to manage multiple alarm views simultaneously.

2. **Cyclic Alarm Monitors:** An alarm monitor shall be available at the end of a alarm monitor queue to cycle the camera views from unacknowledged alarms if the number of cameras to view exceeds the number of alarm monitors. Once the alarm monitor queue is filled, any new alarm will be placed in the queue relative to it's priority and time of occurrence. Existing activated alarm camera views shall reshuffle to accommodate the new alarm. In the event that all the available alarm monitors are used, the oldest active alarm camera shall be added to the cycling alarm monitor. The alarm views shall cycle on this final alarm monitor until acknowledged and cleared by an operator in the event of multiple alarms added to this monitor.

3. **Surveillance monitor:** Operators shall be able to send any Quad View, Sequence View or Single Camera View to a surveillance monitor. User shall be able to clear the monitor using the numeric keypad.

Monitors shall be able to be configured to act as both Alarm and Surveillance monitors. In this case, the monitor behaves as a Surveillance monitor until an alarm occurs, in which case it shall show the alarm video. Once the alarm is acknowledged, the video previously shown (as a surveillance monitor) is displayed again.

In each of these cases, these additional monitors shall be either connected to an Operator Station using a multi-monitor PC card or to other PCs.

Systems that do not offer this functionality are not acceptable.

b) Single Camera

From this display, the user shall be able to:

i. View the live output from the selected camera
ii. Pan, tilt, zoom and focus the camera using a joystick attached to the Operator Station PC
iii. Pan, tilt, zoom and focus the camera using a pointing device attached to the Operator Station PC. Standard Microsoft Windows 2000 or Microsoft XP Professional pointing devices such as a mouse or touch-screen shall be supported.
iv. For cameras which support continuous pan, tilt, zoom (PTZ), a mouse shall be able to be used for continuous PTZ directly in the live video window. By dragging the mouse up or down, left or right in the video window, the operator shall be able to tilt the camera up or down, or pan

the camera left or right. Zooming must also be provided using the mouse in a similar way.

v. Manually record live video. Recording will continue for the configured period of time. Once recording has begun, a stop button shall be provided as well as a counter showing the recording time remaining.

vi. Manually store the current frame of video (snapshot) as a bitmap image file. The file name shall be automatically generated by the DVRMS software and include the camera name, date and time of the recording (to millisecond precision).

vii. Indicate whether video motion detection is currently enabled for the selected camera.

c) **Quad View**

The DVRMS shall support quad views. A quad view consists of up to four related cameras viewed simultaneously on a single display.
The quad view shall be divided into four quadrants. For each quadrant the quad view shall have a camera or be blank. Within each quadrant the quad view shall be configured to cycle between any of the cameras accessible to the user on a configurable time basis.

There shall be no limit to the number of cameras that can be assigned to a single Quad View. There shall also be no limit to the number of available Quad Views.

d) **Sequence View**

The DVRMS shall support sequence views. A sequence view consists of a single camera view, which can be cycled on a time basis. Pan-tilt-zoom cameras, which support preset positions, can have these presets cycled on a time basis. In this way an operator can view a variety of presets on a series of PTZ cameras. Fixed cameras can also be included in the sequence and cycled accordingly.

There shall be no limit to the number of cameras that can be assigned to a single Sequence View. There shall also be no limit to the number of available Sequence Views.

e) **Camera settings**

i. Operator shall be able to change important settings for an individual camera. The details are grouped into several sections:

1. Camera Details
2. Camera Connection
3. Camera PTZ Control
4. Security
5. Camera Deletion

The parameters listed in the sub-sections below are configurable on a per camera basis and their specific selection on a particular camera(s) will not limit the ability to freely select other options on other cameras

as required. It will be easy to change any of these parameters for each camera individually as and when required. Systems that do not allow changes to each camera's parameters on an individual basis will not be acceptable.

Only operator with the highest level of security are permitted to modify camera connection details, camera PTZ control or delete cameras.

ii) Camera Details

The operator shall be able to configure the following parameters for each camera:

1. Name
2. Location
3. Description
4. Camera Number (for fast numeric keypad call-up)

iii) Camera Connection

The operator shall be able to configure the following parameters for each camera:

1. ~~Camera Streamer Type~~
2. Resolution: The following resolutions shall be supported (depending on the functionality of the camera and camera streamer)
   a) 160x120
   b) QCIF (PAL 192x144, NTSC 176x112)
   c) 240x180
   d) 320x240
   e) CIF (PAL 384x288, NTSC 352x240)
   f) 480x360
   g) 640x480
   h) 2CIF (PAL 768x288, NTSC 704x240)
   i) 4CIF (PAL 768x576, NTSC 704x480)
   j) Half-D1 (PAL 720x288, NTSC 720x240)
   k) D1 (PAL 720x576, NTSC 720x480)
   l) Megapixel (1920 x 1080, 1280 x 1024, 1280 x 960 and 1280 x 720)
3. Video Frame Rate: The supported frame rates (in frames per second) shall be as follows:
   i. For Motion JPEG encoding: 30, 25, 20, 15, 10, 5, 3, 2 and 1. Slower frame rates of 1 frame every 2, 3, 5, or 10 seconds shall also be available.
   ii. For MPEG-4 encoding: 30, 25, 15, 12.5, 7.5, 6.25, 3.75 and 1
4. Choice of five levels of video compression, equally distributed from minimum to maximum compression
5. Streamer IP Address
6. Streamer Camera Number (when connected to a multiple port Camera Streamer)
7. Choice of frame rate or bandwidth limited streaming

8. Unicast or multicast transmission of video
9. PAL or NTSC camera format

iv. Camera Control

The operator shall be able to configure any appropriate camera to be PTZ controllable. The following camera types must be supported as a minimum:

1. Video Controls Limited (VCL) Orbiter cameras.
2. Honeywell Video RapidDome cameras
3. Cameras supporting the Pelco P protocol
4. American-Dynamics Speed Dome
5. Hernis Scan System's Cameras
6. Axis Streamer supported PTZ cameras and devices

The following PTZ characteristics shall be tuneable on a camera-by-camera basis from the camera definition pages:

1. Pan speed
2. Tilt Speed
3. Zoom speed
4. Focus speed
5. Iris speed
6. Increment step size

v. Recording

The following methods of recording live video shall be supported:

1. User activated
2. Event activated
3. Scheduled
4. Continuous background recording
5. Video motion detection
6. Snapshot

vi. User Activated

The operator shall be able to configure the following parameters for each camera:

1. **Pre-Record Duration:** The amount of pre-recorded video that will be associated with a user request for recorded video. This will allow the Camera Server to capture video prior to the user request, as well as after the request. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes.
2. **Frame Rate:** Video quality required for user activated recording. It shall be possible to have different frame rates for user and event-activated recordings. Shall be selectable from the entire range of frame rates supported for the camera. For

MPEG encoding, support shall be provided to record only the Index frames, or a subset of the Index frames.

3. **Record Duration:** User activated recordings shall terminate after this period. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes
4. **Retention Period:** The default period that the Camera Server shall retain user-activated recordings before being deleted. The retention period of individual recordings shall be able to be changed on a per-recording basis. Shall be selectable from a list of values ranging between one hour and forever.

vii. Event Activated

There shall be at least four priorities of alarms/events in the Security or Control System:

a) Event (journal priority)
b) Low priority alarms
c) High priority alarms
d) Urgent priority alarms

The following settings shall be individually configurable for each alarm and each camera:

a. Pre-Record Duration: The amount of pre-recorded video that will be associated with an alarm/event. This shall allow the Camera Server to capture video prior to the alarm/event, as well as after the alarm/event. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes.
b. Post-Record Duration: Event activated recordings shall terminate after this period. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes
c. Frame Rate: Video quality required for event activated recording. It shall be possible to have different frame rates for user, event-activated, scheduled and motion detection activated recordings. Shall be selectable from the entire range of frame rates supported for the camera/streamer. For MPEG encoding, support shall be provided to record only the Index frames, or a subset of the Index frames.
d. Retention period: The default period the Camera Server will retain event-activated recordings before being deleted. The retention period of individual recordings shall be able to be changed as necessary. Shall be selectable from a list of values ranging between one hour and forever.

The pre-record and post-record durations in the paragraph above define the maximum allowable limits for each camera. They shall be configured on a camera-by-camera basis. However each alarm or event causing video to be recorded shall also be capable of individual configuration with pre and post alarm periods being selected from a range defined by the maximum settings for the camera.

DVRMS systems requiring a single pre and post record event period to be defined for all alarms and events on an individual camera are not acceptable. DVRMS systems requiring a single pre and post event period to be defined for all alarms and events on all cameras are also not acceptable.

In the case of multiple alarms/events relating to the same camera, a video clip shall be created for each alarm/event.

For cameras that support Pan/Tilt/Zoom Presets, a specified preset location shall be selected automatically when the alarm/event occurs prior to the event activated recording commencing. For example, when an alarm is detected on a security door, the alarm shall trigger a PTZ camera to move to a preset position, which is pointing at the door prior to the DVRMS commencing recording.

viii. Scheduled

The system shall support the ability to schedule recordings for each individual camera for times in the future. For each scheduled recording the user shall be able to configure the following (with descriptions as per User Activated and Event Activated recordings):

1. Start time
2. Stop time
3. Frame rate for the recording
4. Retention period before the recording will be deleted
5. Recurrence (if this is to be a recurring schedule)
6. Description (at least 255 characters)

There shall be no limit on the number of schedules that can be entered for the system. There shall be no limit to the number of schedules per camera.

ix. Continuous background recording

The system shall support the ability to provide continuous background recording from any camera(s) managed by the system. Background recordings will be stored as a discrete series of clips and will continue to operate in the event that communication between the Camera Server and the Database Server is lost. Once communication is restored, all relevant information will be updated to the Database Server.

For each camera the user shall be able to configure the following (with descriptions as per User Activated and Event Activated recordings):

1. Enable / disable background recording
2. Duration of the recorded clip
3. Frame rate for the recording
4. Enable / disable archiving of the clip and the period after which to archive
5. Retention period before the recording will be deleted

6. Enable or disable audio recording (if available)

Systems that require the configuration of multiple time periods to manage background recordings will not be accepted.

Continuous background recordings will not be dependant on network communications between the Camera Server and the Database server. Once configured, these recordings will continue to operate in the event that this communication is lost.

x. Video analytics

DVRMS system must be able to activate recordings automatically based on events generated by the real-time analysis of video from any camera on the system that has Video Analytics enabled. The real time analysis comprises several algorithms.

17.04.07 Video Motion Detection

The DVRMS system must be able to support video motion detection algorithms, which can be executed by the video streamer or the Camera Server. The enabling of Video Motion Detection shall be either:

i. on a continuous basis
ii. Scheduled for particular times, dates, days, months etc
iii. The Camera Server-based algorithm must be able to provide the following functionality:
   a. Detect and track objects
   b. Learn the scene
   c. Adapt to a changing outdoor environment
   d. Ignore environmental changes including rain, hail, wind, swaying trees and gradual light changes

The operator shall be able to configure the following parameters for each camera:

1. Detection Type: Continuous or scheduled
2. Actions to Perform When Motion is Detected: When motion is detected, the following actions shall be performed automatically:
   Generate an alarm in the Security System, Building Control System or Industrial Control System of configurable priority (journal, low, medium, high)

3. Start a recording, with the following configurable settings

   a) Pre-Record Duration: The amount of pre-recorded video, allowing the Camera Server to capture video prior to the detection of motion, as well as after the detection of motion. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes.
   b) Post Record Duration: Motion detection activated recordings will terminate after this period. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes or until motion has stopped.

c) Frame Rate. Video quality required for motion detection activated recordings. Shall be selectable from the entire range of frame rates supported for the camera/streamer.For MPEG encoding, support shall be provided to record only the Index frames, or a subset of the Index frames.

d) Retention period. The default period that motion detection activated recordings will be retained by the Camera Server before being deleted. The retention period of individual recordings shall be able to be changed as necessary. Shall be selectable from a list of values ranging between one hour and forever.

e. Send video to an operator station or alarm monitor: Automatically switch an operator station or alarm monitor to view the camera which has motion detected

4. Motion Finished Time: The amount of time where no motion (inactivity) is detected before the previous motion is classified as completed. This shall be used for allowing recordings to continue until motion has finished.

The DVRMS must provide a means of automatic and manual tuning of the Video Motion Detection for each camera. Incorporated within this tuning are the following:

1. Selection of the frame rate used for detection
2. Optimization for directions of movement In any direction
3. Across the camera view
4. Towards and away from the camera
5. Sensitivity level to fine tune the motion detection algorithm
6. Specification of a minimum object size to allow noise filtering in the system to reduce false detections and alarms.

The DVRMS must also provide the ability to only detect motion in particular regions of the camera view. The ability to graphically select these regions using the mouse must be provided, with an unlimited number of regions permitted per camera. The regions of interest will be multi-verticed shapes with a minimum of 6 vertices to allow the region to be properly matched to the scene being detected. It shall be possible to add and remove vertices from the defined region of interest as needed. Solutions providing only rectangular regions of interest will not be accepted.

Each region must be able to be individually tuned and have separate tuning parameters. This method of tuning must also provide a live tuning window whereby these settings and regions can be altered and tested prior to be being used. This live tuning window shall show the live video as well as the regions of interest. During the time that motion is detected within a region, the border of the region shall change to a different color. In this way, tuning can be performed to achieve the desired performance. Text shall also be provided in the window to alert the user that motion has been detected.

17.04.08 **CAMERAS:**

i. The cameras shall be rugged high speed PTZ dome cameras with inbuilt PTZ driver unit & RS 485 receiver unit, 1/4 inch image format fully performance color CCD dome cameras. These cameras should provide high resolution and high sensitivity suitable for operation in a power plant, both in natural and artificial sighted areas.

ii. The cameras should have features as mentioned below:

a. Suitable for night-time surveillance.
b. Manual or Automatic colour/infra red switching.
c. Automatic picture enhancement to give a balanced picture where there is too little/too much light.
d. Remote camera setup, with on screen menu display.
e. Back light composition
g. Automatic white balance, with mode selection options
h. Contour correction and contrast compression control.
i. Synchronisation selection for Gen lock, external V-lock, mains lock and internal free-running
j. Cameras provided with auto IRIS lens, low lux density (0.1 lux) suitable for functioning in darkness (night shot capability) and Infra red illuminator.

iii. Detailed technical specifications are as under:

a. Imager Supply Interline transfer CCD, ¼" image format.
b. Horizontal resolution 470TVL in PAL B mode.
f. Sensitivity (at f1.6-3.7) - 1 lux
g. Light Range
h. Signal-to-noise : >48dB.
i. Dome Size 4.8"
g. Pattern: 4 pattern, 240 s memory
h. Optical Zoom 25 X
i. Digital Zoom 8 X
L. Power : 230V A C (From Bidder's UPS)

iv. Camera Housing

(a) All the cameras and accessories are to be housed in Weather Proof environmental housing made of aluminum. The housing with heater and blower installed should provide protection for camera/lens assemblies in the ambient temperature range of - 0 deg. C to 60 deg.

(b) The housing should also have thermostatically controlled heater kit, continuous duty blower kit, purge air arrangement, Window wipers available within the housing.

(c) The minimum protection standard for cameras shall be IP 65.
(d) The camera for FOPH and Fuel oil tank area shall be explosion proof type

17.04.09 **OPERATIONAL REQUIREMENTS:**

i. The CCTV system should comply to the following operational requirement.

ii. From the master control panel (keyboard) it shall be possible to select any camera and display the picture on any of the monitors.

iii. Commands from the video server is sent via a onsite receiver/drive unit to the camera which in turn controls the pan/tilt zoom etc., functions.

iv. Operator shall be able to control all the cameras, pan / tilt and zoom functions automatically.

v. The video recorder shall record the activities of all the places where alarm have been alerted. The recording time shall be as per the hard capacity as mentioned in the camera server specifications.

17.04.10 **CABLES:**

17.04.10.01 Network Cabling

A separate Local Area Network (LAN) shall be provided for communication between the system elements. All interfaces to the LAN shall be a minimum of 1000BaseTX Ethernet. The LAN may use additional technologies within the backbone for greater speed or distance. Acceptable types are:

FDDI
100BaseFX
1000BaseSX or 1000BaseLX Gigabit Ethernet
Asynchronous Transfer Mode (ATM)

The LAN shall use standard network cables. Acceptable cable types are:

1. Optical Fiber
2. Category 5e or Category 6 Unshielded Twisted Pair (UTP).

The LAN shall be logically and/or physically separate from any existing LAN infrastructure. Interconnection to other LANs shall be through one of the following:

1. A router
2. A Layer 3 capable network switch
3. As an additional VLAN to the existing LAN equipment. Where required to interconnect VLANs, a router or Layer 3 capable switch shall be provided.

Special Requirments :- In addition to above requirements, The design of the plant security & surveillance system's LAN shall also meet the technical requirements stipulated for Station LAN at cl.no. 4.14.00, Chapter 4, Vol. V.

17.04.10.02 VIDEO CABLING

Where standard CCTV cameras are used, RG59/RG11/RG6 coaxial cable or optical fiber shall be used to connect the camera to a video streamer. Video streamers shall

be located at locations closest to the CCTV cameras. In a new installation it is not acceptable to install a star topology video cabling system with all cabling coming back to a single location.

It is not acceptable for video cables to be run back to the Camera Server. All communications with the Camera Server shall be via the LAN.

Each network camera or video streamer shall have a single network interface to be used for video and Pan/Tilt/Zoom communications.

17.04.10.03. Cables should be suitable for installation as follows:

i. Above ground in open-air location (tray/ducts) in tropical, humid and corrosive atmosphere prevalent in thermal power plant.
ii. Direct buried in underground trenches conduits with uncontrolled back fill and possibility of flooding by water and chemicals.
iii. Laid underground in RCC lined cable trenches with possibility of flooding by water.
iv. Site condition for cables laid above/underground shall be specified in the BOM. If not specifically mentioned therein, the design ambient air temperature of 75 deg. C ground temperature of 40 deg. C, thermal resistively of soil at 150 deg. C cm/watt and altitude and exceeding 1000, above main sea level shall be considered.
v. Cables of reputed make with approval of Owner shall be tested at works as well s site after installation as per applicable standards.
vi. All the required cables shall be supplied on as required basis. Further, 500 meters of each type of cables shall be provided as spare.
vii. Fiber optic cables are to be provided whenever the cable run length/ signal loop length is more than 80 meters.
viii. All the cables are to be provided by the Bidder on as required basis within his quoted lump sump price.
ix. All the cables shall be laid thru GI conduit pipes or suitable grade permanently lubricated HDPE protection pipe as per IS 4984, IS 12235 & TEC.G/CDS-08/01 of suitable size @53% fill factor..
x. To avoid any type of external signal interference with CCTV system signals, All type of protection & hardware shall be provided by bidder.

17.05.00 **CONTRACT QUANTITIES**

i. Cameras along with inbuilt motorized zoom lens and PAN & TILT mechanism.

ii.

Sr.No.	Locations	No.	Camera type	Protection class
	Unit Basis	**-**		
1 a.	TG hall Building	10	Dome Type high resolution CCD Cameras	IP65

Sr.No.	Locations	No.	Camera type	Protection class
1 b.		10	High resolution CCD Cameras	IP65
2	Boiler area	16	High resolution CCD Cameras	IP65
3	ESP/VFD Field area	8	High resolution CCD Cameras	IP65
4	CER	4 / CER	High resolution CCD Cameras	IP65
5	Control room	2/ CCR	High resolution CCD Cameras	IP65
6	Cable Gallery (at different areas)	16	High resolution CCD Cameras	IP65
7	Switch Gear & Battery room	6	High resolution CCD Cameras	IP65
8	Transformer Bay	10	High resolution CCD Cameras	IP65
9	PRDS & Deaerator	4	High resolution CCD Cameras	IP65
	Common Plant Areas	**-**		
10	Ash slurry pump house	2	Dome Type high resolution CCD Cameras	IP65
11	Ash water pump house	2	Dome Type high resolution CCD Cameras	IP65
12	Chimney	1 / Chimney	High resolution CCD Cameras	IP65
13	CW pump house & Forebay	3	Dome Type high resolution CCD Cameras	IP65
14	FOPH	2	Dome Type high resolution CCD Cameras	IP65
15	Main entry gate	4	High resolution CCD Cameras	IP65
16	Cooling tower	Total 2, 1 / Cooling tower	High resolution CCD Cameras	IP65
17	PT plant	2	High resolution CCD Cameras	IP65
18	RO/DM plant	3	High resolution CCD Cameras	IP65
19	Switch yard	5	High resolution CCD Cameras	IP65

Sr.No.	Locations	No.	Camera type	Protection class
20	Coal Handling Plant	10	High resolution CCD Cameras	IP65
21	AHP Control rooms	1 no. / Control room	High resolution CCD Cameras	IP65
22	Effluent Treatment Plant Control Room	2	High resolution CCD Cameras	IP65
23	Stores	6	High resolution CCD Cameras	IP65
24	Ash Silo Area	1	High resolution CCD Cameras	IP65
25	Vehicle Parking area	4	High resolution CCD Cameras	IP65
26	Fire water Pump House	1	High resolution CCD Cameras	IP65
27	Raw Water Pump House	2	High resolution CCD Cameras	IP65
28	Sea water Intake/treatment Plant Control Room	2	High resolution CCD Cameras	IP65
29	Service Building	4	High resolution CCD Cameras	IP65
30	Other areas to be decided during Detailed Engg. Stage	12	High resolution CCD Cameras	IP65
31	Perimeter Intruder Detection System	50 no. minimum with the condition that camera shall be provided at every 200 meter distance.	High resolution CCD Cameras	IP65

iii. The following items shall be provided

SNO	ITEM	QUANTITY
1	Redundant Database Video Management Server	Two (2) no.
2	Camera Server	One no. for main plant control room and minimum seven nos. for common areas*
3	Operating work Stations	Two (2) nos.
4	Inter Connecting Cables	On as required basis without any cost implication to owner.
5	LED TV/Monitors Full HD with work station controller and PTZ controllers.	Seven (7) nos. 32"and Four (4) nos. 40" of latest version with advanced features and minimum requirements mentioned for 55" LED TV in Vol. V, Chapter 13.

* Common areas shall include Office of Chief Engineer/Head of the Project, Office of O&M in charge, Central Fire Station, Water system Control Room, Ash handling system control room, Main Gate of the Plant, any other location to be decided during detailed engineering

iv. One (1) Set Hardware and Software for interfacing with Large Video Screens (LVS) for each of the units are to be provided.

17.06.00 **LIST OF MAKES**

1. Digital Video Management Software: ~~Same as that of DCS/DDCMIS software~~
2. Database & Camera Server: IBM/DELL/HP
3. CCTV Camera: Axis/Pelco/DVtel/BOSCH/Honeywell/ Polixel
4. IP Encoders/Streamers: inbulit in camera
5. LAN Cable: Tyco/RNM/Amp
6. ~~Coaxial Video Cable: Fusion Polymer/Skytone/CCI~~

17.07.00 SECURITY CARD ACCESS SYSTEM

General

Purpose of the facility is to control access to all vital areas within the important plant buildings by electronic card reader system.

Access system cards shall be suitable for individual configuration of access privileges via access control software for controlling access to different locations. Biometric detection system is preferred. However, Bidder can offer other suitable systems also.

Access controlled area entry/exit doors shall be fitted with Electro-magnetic locks. Access card reader shall be proximity card reader type.

The card access system shall have a dedicated redundant server to record all entries and exits through the card access locations. However the actual location shall be derived during detailed engineering

a) Central Control Room
b) Local Control Rooms (including all BOPs)
c) Water Treatment Plant
d) Workshop
e) Stores
f) Switchgear Rooms
g) Main Entrance and Exit of Plant
h) Administration building entrance and exits.
i) Service building entrance and exits.
j) Laboratories

The card access system shall comprise of the following:

a) Access card readers at all above locations and 20% extra locations shall also be considered.
b) Access cards for 1000 persons.
c) Necessary software suitable for accomdating 1500 access cards.
d) Redundant servers with one no. operating work station & A4 sized color printer.

Specification of servers, Operating work stations & printers shall be same as specified at chapter 4, Vol. V with 29" sized LED monitors.

17.08.00 Patrol Guard System

Purpose of the system is to ensure that security guards on patrol duty are carring out their duties diligently by recording the visiting time data for different locations.

The system shall comprise of a selected number of proximity card readers located in various strategic locations of the Thermal Power Project including the perimeter. The patrol guard recorder will record the date and time when the recorder is swiped on the magnetic strips.

The recorders shall be suitable for downloading the data in toa work station.

The system shall be flexible to allow for addition/deletion or movement of monitoring locations.

Al least ten (10) nos. card readers shall be provided. Guard locations to be considered as 100 nos.

Rechagable batteries and chargers shall be provided with each card reader system.

4.14.00 STATION LAN

4.14.01 General

A plant wide Local Area Network (LAN) encompassing the different plant buildings shall be provided. The Station LAN shall interconnect the buildings together and shall facilitate the smooth transfer of Data from one building to the other.

4.14.02 Design and functional requirement

A Plant Wide Network shall be provided, so that pre-selected plant graphics & data can be viewed on real time data basis at selected nodes and from remote locations. The LAN

shall be redundant with redundant industrial grade Ethernet switches and of the industrial grade with 10 Gigabit speed and shall utilize standard IEEE 806.3 protocols such as Ethernet. Complete network shall be provided with External surge protection system and industrial grade fire wall. The Station LAN connection with necessary RJ-45 connectors and other accessories shall be provided at cabins of each occupants in service building, administrative building, fire station building, Time office, Stores, and other buildings.

4.14.03 The Station LAN shall connect following buildings:

i. Station building – Central Control Room
ii. Service building
iii. Coal Handling Plant
iv. Ash Handling Plant
v. Water Treatment Plant
vi. DM plant/RO plant, Desal. plant
vii. Workshop
viii. Central Stores
ix. Switchyard Control Building
x. Sea Water Intake Pump House
xi. Simulator Room.
xii. Admin Building
xiii. Chief Engineer Room
xiv. Conference Room
xv. Discussion Room
xvi Training Room
xvii Cooling water pump house
xviii ESP Control room
xix Mill Plant Area
xx Regeneration building (CPU)
xxi. Any other plant area / building where STATION LAN need to be provided for the purpose of MIS.

4.14.04 The LAN network to be provided for all user's points in all the rooms in the buildings and with in plant premises. Exact user points in each building and with in plant premises will be decided during detailed engineering stage.

4.14.05 The various buildings shall be interconnected through the use of minimum 4 core single mode fibre and shall be connected to the main switch in the Service Building in a STAR topology.

4.14.06 Each building shall be provided with a 12.U high wall-mountable communications cabinet complete with glass door, 6 way power distribution unit, 6 shelves and force ventilation. All units are to be supplied with cage nuts and bolts to house LAN switches.

4.14.07 Industrial grade managed type Switches provided shall be minimum 4x fibre (10000 Base-SX) 10 Gbps uplink ports or 6.x STP (10000Base-T) 10 Gbps uplink ports Ethernet switch, configurable via browser interface and have a 50% spare capacity for future addition of LAN points. These switches shall also be provided with in built diagnostic features, inbuilt redundant 24 V DC power supply features and Integrated Security features (IPS, ACL, Firewall).

4.14.08 The LAN shall be designed in a manner such that failure of an individual switch shall not hamper the failure of the entire system

4.14.09 All provisions required for extending the Station LAN to Admin. Building shall be provided in main LAN switch.

4.14.10. Inter building wiring shall be a minimum of Category 5E STP cable manufactured, tested and verified to ISO11801 EIA/TIA standard. Internal building wiring shall be of the structured cabling type and shall incorporate patch panels on every floor or as required. Communication cables shall be armoured and routed through GI conduit pipes or suitable grade permanently lubricated HDPE protection pipe as per IS 4984, IS 12235 & TEC.G/CDS-08/01 of suitable size @53% fill factor.

4.14.11 A minimum of two RJ-45 ports shall be provided for each specified location Category 5E shuttered modules shall be used in pre-assembled faceplates to save installation time. Modules shall include a slide label system.

4.14.12 All the locations availing the operating stations namely FOPH, CWPH, Boiler A elevation, Turbine 0 meter, ESP, Ash handling Control room, HT Switchgear room, SWAS / Chemical Express lab and DM Plant etc. are to be air conditioned.

4.14.13 Intrusion Detection System (IDS) and Intrusion Prevention System (IPS) Features:

In order to inspect all inbound and outbound network activity and identify suspicious patterns that may indicate a network or system attack from someone attempting to break into or compromise a system on the Station LAN Network, the recommended IDS/IPS should contain the following combined features. Any feature can be selected depending on whether it is to be configured as IPS or IDS.

i. Able to analyze, detect and report on security related events.
ii. Able to inspect traffic and to drop malicious traffic based on the configuration of security policy.
iii. Able to inspect the content of network packets for unique sequences/signatures.
iv. Able to detect and prevent known types of attacks such as worm or Trojan infections and hacks.
v. Able to prevent denial of service (DOS) and Distributed Denial of Service attacks.
vi. Able to prevent abnormal behaviors by monitoring and learning normal network behaviors.
vii. Keeps up-to-date on new threats and vulnerabilities.
viii. Should provide user friendly interface to queries and reports on threats and event data so that security administrators can gain a better understanding of their ability to protect their network.
ix. Should provide detailed activity logs for auditing.
x. Able to detect known threats via deep-packet inspection.
xi. Able to defect unknown threats via anomaly scanning.
xii. Able to detect unknown threats via behavior pattern to protect from zero day attacks.

4.14.14 Network Management Software (NMS):

4.14.14.1 The network management software should contain the below mentioned features.

i. Graphical user interface (GUI) management.
ii. Automated discovery and display of Ethernet topology and devices.
iii. Real-Time SNMP Support
iv. Monitor traffic flow through the device
v. View a device image indicating which ports are active and which modules are installed. It a particular network device is down, it should give the tools like ping/telnet options in the same screen to further diagnose the problem.
vi. Real-time activity and utilization statistics and graphical trends.
vii. Facility of providing pre-defined actions like e-mail, SMS etc. upon any event generated in the network.
viii. Facility of viewing logical graphs of devices like routers, web servers, according to the needs.
ix. The following parameters should be monitored.

a. Device status
b. Port Status
c. CPU utilization
d. Memory Utilization
e. All port utilization including uplink ports.

4.03.03.04 Specifications for Operator Station, Engineering Work Stations

Each operating station & Engineering work stations and any other work stations/PC envisaged in plant shall meet following minimum requirements & as per latest trends at the time of supply:

- On board Intel – Xeon quad core, 3.46 GHz processor with 1066 MHz bus with Hyper threading or higher.
- 4GB DDR3 RAM (min.)
- 1 x 1000 GB IDE Hard Disc Drive of 7200 RPM or higher
- 1024 MB Graphic Accelerator
- System chipset: Intel Express
- 2 x RS – 232 ports
- 1 x parallel port
- 4 nos. USB ports. (2 nos. on front side)
- 1 x 52X DVD/CD Read Drive
- 16 X DVD R/W Drive
- 2 x Ethernet (10 / 100 / 1000MB) cards (Industrial Grade)
- UXGA graphics and monitor 1920 X 1080, 256 colours with MRPII compliant, viewing angle 178° vertical & Horizontal and fastest response time.
- 1 x windows XP/7 Professional or latest & proven version of Windows OS professional with Multimedia
- Ethernet adapter
- Third party operating system, graphical users interface and software, if required.
- 2 nos. graphic output crads minimum

- Optical mouse
- Sound card
- Internal speakers
- Wireless internet & Blue tooth Interface
- Redundant power supply (In built)
- General MS Windows latest, MS-Office Professional, Adobe Acrobat, anti-virus McAfee or equivalent, AutoCAD etc.
- Application engineering & HMI software - to suit project Specific requirement
- All OWS shall be interchangeable

Preferred makes of OWS/EWS/PC's are DELL, HPCOMPAQ, NEC & IBM.

4.03.03.04.01 Peripherals for Operator Station, Engineering Work Stations & Server System

4.03.03.04.02 Full flat Monitors with LED back lighting

The bidder shall furnish OWS/EWS/Servers/PC with coloured **Full flat Monitors with LED back lighting**. OWS/EWS/Servers/PC with **Monitors** shall have a fast cursor control device like a track ball/optical mouse. All **Monitors** shall be of high resolution colour graphics type and with not less than 32 colours. The picture frequency shall not exceed 85 Hz. The resolution required is 1920 X 1080 pixel or better. The picture shall be stable and completely free of any flickering. The screen illumination shall be enough to give good readability. The screen dimensions shall not be less than 24" screen diagonal.

Antiglare hard coating shall be provided. High reliability and long life 24" (Industrial type) or better size monitors shall be supplied by the bidder. **Monitors** shall be equipped with all adjusting elements accessible on the front plate. Monitors with 3D capabilities for graphics shall be provided by bidder.

Monitors along with keyboard & optical mouse shall be mounted on supervisory control console specified elsewhere in the specification.

4.03.03.04.03 Key Board:

Functional key boards for plant operator station shall be of special type adopted to operation tasks and monitor functions. It shall contain all keys necessary for plant operation arranged in an ergonomically manner. Multi function keys shall be provided with automatic display for modified functions. Freely programmable keys (Minimum 101) shall be available for special user application.

Key Board shall be integrated into supervisors control consoles horizontal part.

Provision of functional keyboard shall be in addition to facility for operator control through mouse/track ball.

Membrane type keyboard shall be provided for operator interface with process for plant control and display functions to access plant data in conjunction with control OPERATING STATIONs. Membrane keypad shall be assignable with LED alarms, dedicated display selection keys with spare provision, hardware locking facility to set OPERATING STATION in engineer, supervisor or operator mode. The keyboard

shall have a minimum of 101 configurable keys for assigning most frequently used displays. A minimum of forty of those keys shall have two independently lit LED's used for event-specific alarm annunciation.

Keyboard shall be provided to enable the shift supervisor to develop graphic displays, control system software and system configuration for the DDCMIS. It shall be possible to perform operating interface functions from engineering OPERATING STATION. Assignable function keys shall be provided for execution of command, program etc. Hardware facility shall be provided to set OPERATING STATION in engineer or operator mode. QWERTY type keyboard shall be provided for engineer's functions. QWETRY type Key Board may be offered alternatively for OWS.

4.03.03.04.04 PRINTERS

Line Impact Heavy Duty Dot Matrix Printers

All printers shall be low noise (less than 60dB) type with a minimum of 136 columns. Printing speed shall be a minimum of 300 characters per second. Since the control room printers are high-speed printers, the system shall output to these printers at the rate of 1000 lines of printout per minute as a minimum. This rate shall be independent of the number of printers in simultaneous operation. Style of printing available shall be indicated by the Bidder. The printers shall have graphic capability and any OPERATING STATION display may be printed on the printer. The printing shall be bi-directional and in two colours black and red for sequence of event recording. Paper input capacity shall be with continuous paper feed.

Printers shall accept and print all ASCII characters via an E.I.A. RS-232 C or twenty milliamp current loop interface. Parity checking shall be utilized.

All printers mounted shall be provided with a separate printer enclosure each. The enclosures shall be designed to permit full enclosure of the printers at a convenient level. Plexiglas windows shall be used to provide visual inspection of the printers and ease of reading.

Printer enclosures shall be designed to protect the printers from accidental external contact and each should be removable from hinges at the back and shall be provided with a lock at the front.

If one of the printers fails to operate, it's functions shall automatically be transferred to the other printer. Failure of the printer shall be indicated on all OPERATING STATION's. Printer shall be offered and supplied from reputed manufacturer with latest proven technology. 5 Rims of papers shall be provided by bidder for each printer provided with subject plant.

Coloured Laser Jet printer

Printing Speed	20 ppm (min.)
Resolution	1200 X 600 dpi
Memory	128 MB (min.)
External Port	1 no. USB 2.0 port, and TCP/IP 10/100 Ethernet, Blue tooth interface

Duty Cycle	40,000 pages per month
Pages size	A3, A4, and Transparency etc. with automatic duplex printing facility.

Laser Jet printer (B & W)

Printing Speed	30 ppm (min.)
Resolution	1200 X 1200 dpi
Memory	128 MB (min.)
External Port	1 no. USB 2.0 port, and TCP/IP 10/100 Ethernet, Blue tooth interface
Duty Cycle	15,000 pages per month
Pages size	A4, A3, and Transparency etc. with automatic duplex printing facility. Paper tray - 2

Ink Jet Printers (Coloured)

Printing Speed	30 ppm (min.)
Resolution	1200 X 1200 dpi
Memory	64 MB (min.)
External Port	1 no. USB 2.0 port, and TCP/IP 10/100 Ethernet, Blue tooth interface
Duty Cycle	5,000 pages per month
Pages size	A4, Transparency etc.
Duplex printing	Automatic

Five sets of print cartridges and Five rims of papers shall be provided with each printer provided anywhere in the plant by bidder with each DDCMIS, DCS & PLC system and any other system specified elsewhere in specification.

Preferred makes of printers are HP, Canon, Fuji Xerox, & Epson.

11.	Networking Capability	:	USB / Ethernet
12.	Coping	:	Max Original Size – A3, Continuous Coping (1-999)
13.	Accessories	:	i) Adapters ii) Connector Cable iii) Duplex Unit. Automatic iv) Optional Paper feeder- 2 Nos

4.03.03.06 General Specification of the server:

Enclosure	:	6U Rack Mountable server / Tower type Sever
Processor	:	Intel Xeon Quad (4) Core 64 bit Processor capable 3.6 GHz with 16MB L3 cache memory per processor, Dual independent 1333 MHz system bus (2 way SMF) or better.
Memory	:	64GB ECC DDR – 3, 800 SDRAM

Video	:	Integrated with 64MB SDRAM
Resolution	:	1920 x 1080
Drives	:	HDD – RAID 5 (1000 GB) Ultra 320 SCSI adaptors with internal storage capacity 3.6 TB DVD/CDROM – 24X CD – RW/DVD IDE combo USB – 4 ports DAT – 36 / 72 GB
Peripherals	:	PS/2 keyboard Optical Mouse
Operating system	:	Windows 2008 server version standard / latest Enterprise Edition or latest & proven version of Windows Operating system
Backup & Disaster Recovery	:	VERITAS \ CA \ Tivoli \ any other
Environmental	:	Operating Temp range - 10°C to 35°C Humidity range - 8 to 80% (Non-Condensing) Vibration 0.25 G at 3 to 300 Hz for 15 Minutes.
Software	-	General MS Windows latest, MS-Office Professional, Adobe Acrobat, anti-virus McAfee or equivalent, etc. Application engineering & HMI software - to suit project Specific requirement
Miscellaneous	:	i. 1 Parallel port ii. 1 Serial port iii. 4 – 10/100/1000 MB/1GB network ports iv. Two non-boards and two added v. External SCSI port vi. Dual hot plug power supplies vii. Dual Hot plug fans viii. 2 PCI Express slots (1x4 lane and 1x8 lane) ix. 2 PCI X slots (64bit/100MHz) x. 2 PCI slots (one 32bit/33MHz, 5V & one 64bit/66Mz) xi Redundant Server shall be provided, wherever required. xii. LED based 24” sized Monitors.

Preferred makes of OWS & Servers are DELL, HPCOMPAQ, Lenovo.

TECHNICAL SPECIFICATIONS FOR 55" PROFESSIONAL DISPLAY.

Display:

Screen size	55 inches
Resolution	1920x1080 (16:9)
Brightness	700 cd/m2
Contrast ratio	3000:1
Pixel pitch	0.53025(H) * 0.53025(V)
Colors support	8bit – 16.7M

Signal Input:

Video Signal Analog D-SUB, DVI-D, Display port, CVBS, HDMI1, HDMI2

Features:

Special Features

Lamp error detection, Brightness sensor, Anti Retention, Temperature Sensor, RS232C/RJ45 MDC, Built in speaker(10W + 10W), Plug and Play (DDC2B), PIP/PBP, Video Wall(10x10), Pivot Display, Button Lock, Digital Daisy Chain, Smart Scheduling, Smart F/W update.

9.06.05.6 Fiber Optic Cable

A	**Fiber:** The optical fiber core shall be of ultra pure fused silica glass coated with UV-cured acrylate suitable to withdraw temperature of about 80 Deg C (continuous). Fiber Optic cables shall be suitable for installation on cable tray, duct bank, cable trench, direct burial as necessary.		
1	Type	Multiple single mode & Multi-Mode Fiber to avoid usage of any repeaters.	
2	**Core Diameter**	**Multimode Fiber cable**	**Singlemode Fiber cable**
		62.5 ± 2 microns or 50 ± 2 microns depending upon distance between source & destination.	9 ± 1 microns
3	Cladding Diameter	125 ± 2 microns	
4	Fiber Proof test	As per IEC/EIA & other international standard.	
5	Coating Diameter Test	As per IEC/EIA & other international standard.	
6	Number of Fibers/core	Six (Colour Coded) with min. 100% spare core (Fibers)	
B1	**Optical Charactertics – Bandwidth, Attenuation & Numerical Aperture**	**For multimode fiber cable with core diameter 62.5 ± 2 microns:**	**For multimode fiber cable with core diameter 50 ± 2 microns:**
1	Bandwidth @ 850 nm Bandwidth @ 1300 nm	160 MHz-Km min 500 MHz-Km min	500 MHz-Km min 500 MHz-Km min
2	Attenuation @ 850 nm Attenuation@ 1300 nm	3.0 dB/Km max 0.8 dB/Km max	3.0 dB/Km max 0.8 dB/Km max
3	Numerical Aperture	0.275 ± 0.015	0.200 ± 0.015
B2	**Optical Charactertics - Attenuation**	**for Singlemode fiber cable outside plant:**	**for Singlemode fiber cable inside plant:**
1	Attenuation@ 1310 nm Attenuation@ 1550 nm	0.35 dB/Km max 0.2 dB/Km max	1 dB/Km max 1 dB/Km max

C	**Cable Construction:** Fiber Optic cable shall be of loose tube design. Typically, fibres shall be housed in groups of 6 (minimum) within gel-filled buffer tubes to protect against ingress of moisture and vibration. The tubes shall be manufactured with industry standard material tools & practices. The buffer tubes shall be stranded around the central strength member utilizing reverse oscillating lay (ROL). Blank fillers shall be used as necessary to maintain circular cable structure. Fillers shall be flame retardant and moisture resistant. The cable shall be of dual jacket & armoured. Optic Fibre cable shall be polymer coated, galvanised corrugated steel taped armoured, fully water blocked with central dielectric material for outdoor/indoor application so as to prevent any physical damage. Two highly visible ripcords are placed under the jacket to aid in sheath removal. A co-polymer coated steel tape is corrugated and wrapped around the inner jacket to provide additional cable compression strength and Termite & rodent protection. A ripcord is also placed underneath the armour for easy outer jacket removal.	
1	Outer Colour	Orange
2	Outer Jacket	Polyethylene minimum 1.5mm thick, Flame retardant & UV resistant.
3	Inner Jacket	Core-locked flame retardant polyethylene
4	Filler / Strength member	As per Manufacturer's standard
5	Central Strength member	FiberGlass reinforced plastic (FRP) and Buckle resistant material to provide both tensile and anti bucking strength to the cable.
6.	Details marked at every meter on outer sheath.	Manufacturer's Name, Month and Year of Manufacturer, Coded description of the cable based on telcordia"s (bellcore) SR-2014 suggested optical cable code (SOCC), Sheath identification Number, Sequential Length marking in meter, A telephone Handset symbol to distinguish communication from power cable as per NESC section-35G.
7.	Life Expectancy	Fiber Optic cable shall provide a long life expectancy of minimum 25 years under continuous operation without degradation to optical or mechanical performance.
D	**Stripping Ability**	**All layers easily removed with Commercially available tools**
E	**Installation:**	
1	Minimum bending radius	20 X D (D=core Diameter) - During Installation , Short Term , loaded 15 X D (D=core Diameter) – Installed, Long

		Term , No load
2	Maximum Tensile Load/Strength	During Installation: 2200 N Installed: 1500N
3	Method of laying	Directly laid in cable trays / duct bank / clamped with available structure
4	Pulling	Ordinary cable grips
F	**Storage Temperature**	- 20 ^{0} C to 60 ^{0} C
G	**Operating Temperature & Humidity**	- 20 ^{0} C to 70 ^{0} C & 100%
H	**Data Speed performance**	10 Gbps minimum
I	**Test Specification (EIA/TIA – STD455 or Equivalent):**	
1	Impact Resistance	2000 Impacts minimum
2	Crush Resistance	4000 N/10cm minimum
3.	Compressive Strength	3000 N minimum
J	**Moisture/Water Resistance**	Water blocking layer, Cable shall withstand water penetration when tested with a one meter static head or equivalent continuous pressure applied at one end of a one meter length of filled cable for one hour. No water shall leak through the open cable end.
K.	**Optical time Domain reflectometer**	a. A recording optical time domain reflecto meter (OTDR) will be utilized to test for end-to-end continuity and attenuation of each optical fiber. The OTDR shall be equipped with data storage, printer, help feature, compare trace features and OTDR software. The data storage unit must include a built-in floppy disk drive capable of storing a minimum of 100 test traces. b. Data traces saved to disk shall include the following labels. i. Fiber Identification (ID) with a minimum of 10 characters. ii. Cable ID with a minimum of 10 characters iii. OTDR location with a minimum of 20 characters iv. Far End location with a minimum of 20

		characters. v. Test operator initials with a minimum of 3 characters. c. The printer shall preferable be internal. The printer shall be able to print data traces within 30 seconds or less. The machine setting used to repeat tests at a later time shall include index, range, wavelength, average time, pulse width and scale settings. The test results (on printout) shall provide information including: loss, distance, reflectance, data and time. d. The requirements for the compare trace feature include the ability to recall two historical traces from a diskette and display them simultaneously for analysis and printing. The compare trace must compute and display a single graph representing any differences between two traces. The compare trace must be able to recall historical traces from a discrete and perform the same tests on connected live fibers. The compare trace shall perform a two point loss measurement test for any two particular fibers in a comparison analysis. The losses between the two points on the each fiber shall be displayed, and the differences between the two readings clearly shown. e. The OTDR must be equipped with software to support all of the required functions. The software shall provide for printing of whole set of traces (batch print) with minimal commands eliminating the time spent for printing traces individually. **f.** Bidder shall provide all mounting accessories, cables and connectors required to establish data communication.
L.	Fiber Optic splicer, terminator and tool kit box	Bidder shall provide new unused tools comprise of splicer and fusion jointer and tool kit comprise of cutter, stripper,

		polishing tool, handheld microscope, heat shrinkable sleeve, scissor, knife etc as required for maintenance and commission.
M.	**Standards**	Optical cable shall be conform to i) IEC 60794/IEC 60793 & EIA/TIA 455. ii) Low smoke(IEC 1034 -light transmittance of 80%). iii) Halogen free(IEC 754: 1&2-maximum acid gas generation shall be 2% by weight and PH >4.3). iv) Fire & flame retarded (IEC 331,IEEE 383). v) Rodent resistant. vi) Crush Resistant (EIA -455-41). vii) Impact Resistant (EIA -455-25). Bidder shall submit Type test report for review ,conform to IEC 60794, IEC 60793, IEEE 383, IEC 754: 1 & 2,IEC 331 ,IEEE 1034 and EIA/TIA standard. Colour codes shall be as per EIA/TIA 598-A.
N.	**TESTS**	Following minimum test as per any approved standard shall be carried out on the cables: a. Attenuation and Dispersion characteristics tests b. Proof Tests c. Macro-Bend resistance Test d. Mechanical Test e. Low and High Temperature cable Bend Test f. Impact resistance Test g. Compressive strength Test h. Tensile strength Test i. Cable Twist test j. Cable cyclic flexing test k. Environmental characteristics Test l. Temperature cycling test m. Colour permanence Test n. Cable Aging test o. Water penetration test **p.** Lightning Test **q.** Kink Test **r.** Crush Test

9.06.05.7 Data Cable:

Data transmission cables are control & signal cables used in electronics of computer system, electronic control equipment etc. in power plant data processing system. The cable has an overall screening which suppresses external electrical influences and ensures precise pulse transmission. The screen braiding of tinned copper wires is wrapped around the core or inner sheath.

i) Min. bending radius for flexing	:	15x cable diameter.
ii) Temp. Range	:	(-30 to +80) deg. centigrade
iii) Loop resistance	:	Max.78.4 ohm/km.
iv) Inductance	:	0.65 mH / Km.
v) Coupling	:	200 pF / Km.

Co axial and fibre optic cables are also used as data cables.

9.06.05.8 NOTE: All cables near high temperature zone shall be high temp cables, which shall be terminated at a junction box in normal temperature zone. Thermocouple extension cables and copper conductor cables for high temperature applications shall be with insulation of individual conductor and outer sheath of extruded FEP (i.e. Teflon) as per VDE 0207 Part 6 and ASTMD 2116. The thickness of insulation shall be 0.5 mm nominal (i.e. 0.4 mm minimum). These cables shall be single / Multipair twisted & shielded.

9.06.05.9 Fire survival instrumentation Cables shall be similar to the Fire survival control cables specified in electrical section (Vol. IV) except that Cables for analog signals shall be annealed tinned copper conductor 0.5 sq. mm sized, with individual pair shielding & over all shielding and Cables for binary signals shall be annealed tinned copper conductor 0.5 sq. mm sized with over all shielding only. In addition the cables shall have high degree of immunity from electromagnetic interference.

9.06.06 **TYPE AND ACCEPTANCE TESTS FOR INSTRUMENTATION CABLES**

9.06.06.01 After completion of manufacture, type and acceptance tests as specified in relevant standards and herein shall be conducted and requisite number of copies of test certificates as per Distribution Schedule shall be furnished.

9.06.06.02 The Owner may, at his discretion, waive type tests provided type tests reports of tests carried out on identical materials(s)manufactured by the Bidder in India in last 5 years are furnished. The Bidder shall furnish copies of such type test reports with the Bid or indicate when they expect to make these available.
After completion of manufacture, following minimum type and acceptance tests as specified in relevant standards and herein shall be conducted and requisite number of copies of test certificates shall be furnished. The Owner may, at his discretion, waive type tests provided type tests reports of tests carried out on identical materials(s)manufactured by the Bidder in India are furnished. The Bidder shall furnish copies of such type test reports with the Bid or indicate when they expect to make these available.

I. TYPE TESTS:

CHAPTER-13

PLANT SECURITY AND SURVEILLANCE SYSTEM

2.3.13 Plant Security and Surveillance Systems

2.3.13.1 General Requirements

A complete integrated plant security and surveillance system complete with all hardware and software as required shall be provided. The system to be provided shall include all necessary hardware, software, firmware, interfaces and accessories, all related civil and masonry work required for implementing a fully functional plant security and surveillance system for a modern power generation utility. Bidder's offered plant security and surveillance shall include complete hardware & software as per actual additional requirement, but not limited to the details specified in subsequent paragraphs.

The intent of the specification is to define the functional & design requirements for the Perimeter Intruder Detection System and CCTV System meant for gathering video information from the various perimeter & operational areas of the power plant. ~~The Perimeter Intruder Detection System and CCTV should seamlessly integrate with Bidder supplied DDCMIS~~. The Bidder shall be responsible for selection, design, engineering, manufacture, testing at manufacturer's works/site, installation and commissioning of the system to the satisfaction of Owner. All the cables, cable trays, power packs, erection hardwares etc. are also included in bidder's scope.

The Bidder's scope shall also include successful demonstration of cable trays, junction boxes, earth wire and accessories like standard brackets, nut-bolts, glands, lugs, conduit sleeves, etc., as required, to complete the proper installation conforming to IS:1881, IS:1882 of all the equipments supplied as covered in this specification. All equipment, accessories and facilities required for completeness of this system shall be furnished by the Bidder within the quoted price, whether these are specifically mentioned herein or not.

The CCTV System offered by the Bidder shall be from reputed manufacturer who should have designed, manufactured, tested and commissioned a distributed type CCTV systems as specified in thermal power plants or large industrial installation as on the date of bid opening. The system and all the equipment shall conform to the latest edition of India / International and CCITT standards as applicable.

The Bidder shall guarantee satisfactory performance of the equipment under stipulated variations of voltage and frequency. The design and manufacture shall be such that equipments/components of same type and rating shall be interchangeable.

The design of the plant security & surveillance system shall take into account the potential security risks to the power plant. Plant security and surveillance system shall be an integrated system comprising the following systems/facilities:

a) Perimeter Intruder Detection System
b) CCTV Monitoring of Plant area/ equipments.
c) Security card accessing system.
d) Patrol Guard System.

2.3.13.2 Power Supply Arrangement

2 nos. of feeders 415 V shall be taken by the bidder from the respective LT Switchgear nearby the consumers. Further the Bidder shall provide Suitable arrangement with changeover circuitry, transformer for powering CCTV System from separate industrial grade parallel redundant UPS system with Lead acid plante type battery (1 hour backup) for camera servers, digital video management servers, OS in the security room and control room as well as for cameras to be located in the main plant area. If the offered equipment is operating at voltage level other than available in plant, the Bidder shall provide all required hardware, within lump sum quoted price to make the offered system compatible with specified power supply arrangement. UPS shall be provided with same features as specified elsewhere in specification. All type of cables required for Plant security and surveillance system shall be in bidder scope.

2.3.13.3 Design and Technical Requirements

For the purpose of perimeter detection and CCTV monitoring, a security room shall be provided in the Time Office. This room will house servers, OS, Network controllers, Multiplexers, Video recorders, monitors, PTZ units and other associated accessories. CCTV control room & redundant data base video management server & camera server room shall be air-conditioned room.

All cameras for perimeter detection system and CCTV system shall be connected to suitably located RTUs (Remote Terminal Units) in groups through multiple mode armoured “Fibre Optic cable or UTP cables” for transferring camera video signals. RTUs will then be connected to a network controller which will sit on separate CCTV specific plant/Station LAN. Network controllers shall be capable of accommodating number of RTUs. GI conduit pipes shall also be provided by bidder, wherever required.

RTUs shall be suitable for accepting different types of field devices e.g. fixed cameras, dome cameras, card access readers etc.

All camera images shall be continuously recorded. System offered shall allow to record and hold camera images for a minimum period of 30 days. Facility for transferring camera images to separate recorders/ data storage devices and play back facility of the same shall be provided. Bidder shall also provide data storage devices to store the backup data for one year.

Camera image monitoring and viewing facility shall be provided at Time Office’s security room, CHP control room, AHP control room, DM plant control room, station incharge room, Chief engineer room and at CCR. While from CCR, AHP control room, DM plant control room, station incharge room, Chief engineer room & CHP control room, only CCTV monitoring will be carried out, both perimeter detection and CCTV viewing shall be possible from security room.

Alarm & Display monitors shall be provided as follows:

a) 2 nos Operating Stations (OS) with PTZ controller each at Security room in Time Office for each with A4 sized colored LJP of Perimeter Monitoring & CCTV.

b) 2 no. > 32" diagonal sized full HD LED TV each of latest version with advanced features at main security office to show the real time images for CCTV system & perimeter intruder detection system respectively.

c) Four (4) no. 40" LED TV/monitor each with work station grade controller & PTZ controller, keyboard, mouse / track ball at CCR for CCTV monitoring. These LED TVs shall be installed and hanging from the false ceiling of the Central control room. Out of Four LED TV/monitor, one shall be unit 1, second shall be for unit 2 and other two nos. shall be for common plant packages.

d) One (1) no. 32" LED TV/monitor each with work station grade controller & PTZ controller, keyboard, mouse / track ball at CHP control room for CCTV monitoring.

e) One (1) no. 32" LED TV/monitor each with work station grade controller & PTZ controller, keyboard, mouse / track ball at AHP control room for CCTV monitoring.

f) One (1) no. 32" LED TV/monitor each with work station grade controller & PTZ controller, keyboard, mouse / track ball at DM plant control room for CCTV monitoring.

g) One (1) no. 32" LED TV/monitor each with work station grade controller & PTZ controller, keyboard, mouse / track ball at Chief Engineer room for CCTV monitoring.

h) One (1) no. 32" LED TV/monitor each with work station grade controller & PTZ controller, keyboard, mouse / track ball at Station Incharge room for CCTV monitoring.

2.3.13.4 Perimeter Intruder Detection System

Perimeter intruder detection system shall meet following requirements:

a) The detection system shall be installed along the entire length of fence/ boundary of the power plant and all entry& exit gates on the boundary. The system shall be capable of providing 24 hour continuous surveillance by means of a network of video cameras.

b) The intruder detection system shall be based on video motion detection technology.

c) The system shall be able to identify and distinguish between whether the intruder is a human being or an animal.

d) Upon detection of intrusion, suitable alarms to be raised to security guards and corresponding camera image shall be displayed on a high resolution dedicated alarm screen.

e) The system shall allow for the adjusting the sensitivity to reduce false alarms.

f) When there is no intrusion, the camera images shall be displayed and recorded on a multiplexed basis.

g) As many cameras as required for proper coverage of total perimeter length shall be provided. However, individual camera coverage shall not exceed 200 meter distance along the perimeter length.

The Perimeter intruder detection system and CCTV system shall be able to provide surveillance of different locations the plant. The different areas to be viewed are indicated at the end of this chapter and the controls are to be provided in the Control Room. Bidder to note that the locations indicated in this sub-section are tentative only. The exact locations shall be decided during detailed engineering for the various operational areas of the power plant.

The system shall comprise of Redundant Digital Video Management Server System capable of controlling 256 nos. of Cameras for Zoom, Pan/Tilt, Multiple preposition and auxiliaries, suitable number of camera servers for common areas for controlling both manually and automatic and all other accessories required to provide best quality video with controls for making the system complete. The Redundant Digital Video Management Server System for perimeter intruder system shall be similar to the same hardware and operating system configuration of database server envisaged for CCTV package.

The system operation would be of covering the complete view of the areas with pan / tilt, zoom, propositioning of the cameras and with programmability to monitor any camera on any monitor either manually or automatically in a defined switching. The system shall be suitable for installation and shall be able to work successfully in Thermal power plant environment. The system shall have the following facilities:

1. Zooming
2. Pan control
3. Tilt control
4. Computer interface
5. Logging printer part
6. Multiple prepositions
7. Programmability
8. Alarm interface

The Bidder shall indicate details of the video and controls in his proposal. The system supplied shall be complete in all respects for reliable performance. The Bidder shall submit the details block schematic, video, signal & power wiring diagram, describing the connections between the Camera's, streamers, digital video management server & camera server. Programming required shall be done by the Bidder for satisfactory operation. The CCTV system shall be seamlessly integrated with DDCMIS system software for alarm transfers with pot. Free contacts.

2.3.13.5 Detailed description of the system components:

The CCTV system shall have digital video recording facility as well as data management facility at suitable independent location. Bidder shall provide suitable digital video recording & management system (DVRMS) for this purpose. The Digital Video Recording & Management System shall include:

1. Redundant Database Servers
2. Camera Servers
3. Security or Control Systems
4. Operator Stations
5. Network connected cameras ~~and/or network connected camera streamers~~
6. Network infrastructure

2.3.13.6 Redundant Database Servers

The Database Server contains a database of all network-connected cameras and their configuration. The Database Server shall:

a. Manage the system database, containing details including

   i) System configuration
   ii) Camera configuration and settings
   iii) Recording configuration and settings
   iv) Configuration of Quad Views and Sequences
   v) Details of recordings
   vi) Schedules
   vii) Operator security details
   viii) Configuration of Surveillance and Alarm Monitors
   ix) Configuration of Video Analytics

b. Manage communication between the Operator Stations and the Camera Servers

c. Video Motion Detection

d. Allow alarms/events in the Security System or Control System to initiate recordings

e. Report any camera failures or recording failures to the integrated Control system or Security system

f. Provide a full audit log of all system status (camera, streamer, server availability) and operator actions.

The Database Server shall be able to be use in a redundant configuration, using two separate Database Servers (being executed on separate Work stations). The backup Database Server shall be

continuously synchronized with the master Database Server to ensure that it is always up-to-date and ready for a fail-over, when required.

The DVRMS must be capable of running a pair of similarly configured computers in a hot backup configuration where at any point in time, one is the acting Primary and the other is acting as the Hot Backup. An on-line database duplication mechanism must be supported.

Simply having each Database Server scan each Camera Sever, or requiring the Camera Servers send all updates to both Database Servers is not acceptable. The database duplication must be performed on a per-transaction basis for two reasons:

1. To ensure that the duplicated Backup database is consistent at all times with the Primary database
2. To avoid unnecessary loading of Camera Servers caused by duplicate polling
3. It must be possible to remove one of the redundant systems for maintenance without interrupting operation, and upon its reinstatement, re-synchronize the databases, again without interruption to system operation.

The Database Server (RAID 5 grade) shall be able to operate with no performance degradation using the following hardware and operating system configuration:

1. Intel Xeon Quad (4) Core 64 bit Processor capable 3.6 GHz with 16MB L3 cache memory per processor 16 GB RAM
2. Hard Disk storage of 1000 GB min. It shall be as per system requirements.
3. 100/1000 Mbps NIC for network connection to the other components of the DVRMS
4. Graphics card supporting 24-bit colour and with 64 MB video RAM if the Database Server is also used as a client station
5. Windows 2003 Server (SP1), Windows 2000 Server (SP4), Windows XP Professional (SP2) or Windows 2000 Professional(SP4)
6. Microsoft SQL Server 2000 with Service Pack 4
7. Microsoft Internet Explorer 8.0 with Service Pack 1 or higher
8. Application software
9. Dual hot plug power supplies
10. Dual Hot plug fans
11. 29” LED monitors with 1920 x 1080 pixel resolutions & 178 deg V/H viewing angle.

2.3.13.7 Camera Servers

The Camera Server(s) must be capable of supporting a large amount of disk space for online video storage and access to high capacity archiving mechanisms for the removal of stored video to off-line media.

The Camera Server shall:

1. Manage live video from camera streamers

2. Transmit live video to Operator Stations
3. Receive camera control commands from Operator Stations and then send the commands to cameras
4. Store live video to hard disk
5. Transmit previously stored video to Operator Stations
6. Archive previously stored video to off-line storage media
7. Retrieve archived video from off-line storage media
8. Provide Video Analytics including:
9. Video Motion Detection
10. Export the recordings into MPEG format so that it can be viewed using standard tools including Microsoft's Video Player.

The Camera Servers shall rely on the Database Server for all camera database information. Proprietary hardware platforms are not acceptable.

The Camera Server shall be able to operate with no performance degradation using the same hardware and operating system configuration of database server.

1. Configuration of Operating stations shall be same as specified at cl.No. 2.3.4.26 with 29" sized LED monitors.
2. Memory of database & camera server is minimum as specified above, memory shall be suitable to have 1 month recording in server. Further DVD/Memory storage device shall be provided by bidder for past data storage of min one year for retrieval.
3. Server shall be rack mounted.
4. The server/OWS processor shall be latest and got approved from owner at the time of supply.
5. The Operating system shall be latest at the time of supply.

2.3.13.8 Application Software Functions

i) Live Video

a. The live output from cameras shall be viewed through a series of displays.

b. These shall support:

1. Single camera view
2. Quad view of up to four cameras
3. Sequence view of camera preset positions
4. Modifying settings for a camera
5. Modify recording settings for a camera
6. Adding and deleting cameras
7. Creating schedules for recordings and video motion detection
8. Modifying Video Analytics settings and tuning for video Motion Detection users shall be able to select a camera from a tree control listing the cameras available to the user.

c. The system shall also support multiple monitors in the following way:

1. Alarm monitor: When an alarm occurs in the Security or Control System Server, the live video output of the camera associated with that alarm shall be switched directly to an alarm monitor. The user shall be able to acknowledge the alarm to clear the monitor using the numeric keypad. Cameras that are directed to alarm monitors will not be removed from the queue unless explicitly cleared by the operator. It shall be possible to create a queue of alarm monitors to manage multiple alarm views simultaneously.

2. Cyclic Alarm Monitors: An alarm monitor shall be available at the end of a alarm monitor queue to cycle the camera views from unacknowledged alarms if the number of cameras to view exceeds the number of alarm monitors. Once the alarm monitor queue is filled, any new alarm will be placed in the queue relative to its priority and time of occurrence. Existing activated alarm camera views shall reshuffle to accommodate the new alarm. In the event that all the available alarm monitors are used, the oldest active alarm camera shall be added to the cycling alarm monitor. The alarm views shall cycle on this final alarm monitor until acknowledged and cleared by an operator in the event of multiple alarms added to this monitor.

3. Surveillance monitor: Operators shall be able to send any Quad View, Sequence View or Single Camera View to a surveillance monitor. User shall be able to clear the monitor using the numeric keypad.

4. Monitors shall be able to be configured to act as both Alarm and Surveillance monitors. In this case, the monitor behaves as a Surveillance monitor until an alarm occurs, in which case it shall show the alarm video. Once the alarm is acknowledged, the video previously shown (as a surveillance monitor) is displayed again.

5. In each of these cases, these additional monitors shall be either connected to an Operator Station using a multi-monitor PC card or to other PCs. Systems that do not offer this functionality are not acceptable.

ii) Single Camera

a. From this display, the user shall be able to:

b. View the live output from the selected camera

c. Pan, tilt, zoom and focus the camera using a joystick attached to the Operator Station PC

d. Pan, tilt, zoom and focus the camera using a pointing device attached to the Operator Station PC. Standard Microsoft Windows 2000 or Microsoft XP Professional pointing devices such as a mouse or touch-screen shall be supported.

e. For cameras which support continuous pan, tilt, zoom (PTZ), a mouse shall be able to be used for continuous PTZ directly in the live video window. By dragging the mouse up or down, left or right in the video window, the operator shall be able to tilt the camera up or down, or pan the camera left or right. Zooming must also be provided using the mouse in a similar way.

f. Manually record live video. Recording will continue for the configured period of time. Once recording has begun, a stop button shall be provided as well as a counter showing the recording time remaining.

g. Manually store the current frame of video (snapshot) as a bitmap image file. The file name shall be automatically generated by the DVRMS software and include the camera name, date and time of the recording (to millisecond precision).

h. Indicate whether video motion detection is currently enabled for the selected camera.

iii) Quad View

The DVRMS shall support quad views. A quad view consists of up to four related cameras viewed simultaneously on a single display. The quad view shall be divided into four quadrants. For each quadrant the quad view shall have a camera or be blank. Within each quadrant the quad view shall be configured to cycle between any of the cameras accessible to the user on a configurable time basis. There shall be no limit to the number of cameras that can be assigned to a single Quad View. There shall also be no limit to the number of available Quad Views.

iv) Sequence View

The DVRMS shall support sequence views. A sequence view consists of a single camera view, which can be cycled on a time basis. Pan-tilt-zoom cameras, which support preset positions, can have these preset cycled on a time basis. In this way an operator can view a variety of preset on a series of PTZ cameras. Fixed cameras can also be included in the sequence and cycled accordingly.
There shall be no limit to the number of cameras that can be assigned to a single Sequence View. There shall also be no limit to the number of available Sequence Views.

v) Camera settings

a. Operator shall be able to change important settings for an individual camera. The details are grouped into several sections:

1. Camera Details

2. Camera Connection
3. Camera PTZ Control
4. Security
5. Camera Deletion

The parameters listed in the sub-sections below are configurable on a per camera basis and their specific selection on a particular camera(s) will not limit the ability to freely select other options on other cameras as required. It will be easy to change any of these parameters for each camera individually as and when required. Systems that do not allow changes to each camera's parameters on an individual basis will not be acceptable.

Only operator with the highest level of security are permitted to modify camera connection details, camera PTZ control or delete cameras.

b. Camera Details

The operator shall be able to configure the following parameters for each camera:

1. Name
2. Location
3. Description
4. Camera Number (for fast numeric keypad call-up)

c. Camera Connection

The operator shall be able to configure the following parameters for each camera:

1. Camera Streamer Type
2. Resolution: The following resolutions shall be supported (depending on the functionality of the camera and camera streamer)
   a. 160x120
   b. QCIF (PAL 192x144, NTSC 176x112)
   c. 240x180
   d. 320x240
   e. CIF (PAL 384x288, NTSC 352x240)
   f. 480x360
   g. 640x480
   h. 2CIF (PAL 768x288, NTSC 704x240)
   i. 4CIF (PAL 768x576, NTSC 704x480)
   j. Half-D1 (PAL 720x288, NTSC 720x240)
   k. D1 (PAL 720x576, NTSC 720x480)
   l. Megapixel (1920 x 1080, 1280 x 1024, 1280 x 960 and 1280 x 720)

3. Video Frame Rate: The supported frame rates (in frames per second) shall be as follows:

   a. For Motion JPEG encoding: 30, 25, 20, 15, 10, 5, 3, 2 and 1. Slower frame rates of 1 frame every 2, 3, 5, or 10 seconds shall also be available.
   b. For MPEG-4 encoding: 30, 25, 15, 12.5, 7.5, 6.25, 3.75 and 1

4. Choice of five levels of video compression, equally distributed from minimum to maximum compression
5. Streamer IP Address
6. Streamer Camera Number (when connected to a multiple port Camera Streamer)
7. Choice of frame rate or bandwidth limited streaming8. Unicast or multicast transmission of video
8. PAL or NTSC camera format

d. Camera Control

The operator shall be able to configure any appropriate camera to be PTZ controllable. The following camera types must be supported as a minimum:

1. Video Controls Limited (VCL) Orbiter cameras.
2. Honeywell Video Rapid Dome cameras
3. Cameras supporting the Pelco P protocol
4. American-Dynamics Speed Dome
5. Hernis Scan System's Cameras
6. Axis Streamer supported PTZ cameras and devices

The following PTZ characteristics shall be tuneable on a camera-by-camera basis from the camera definition pages:

1. Pan speed
2. Tilt Speed
3. Zoom speed
4. Focus speed
5. Iris speed
6. Increment step size

e. Recording

The following methods of recording live video shall be supported:

1. User activated
2. Event activated
3. Scheduled
4. Continuous background recording
5. Video motion detection

6. Snapshot

f. User Activated

The operator shall be able to configure the following parameters for each camera:

i) Pre-Record Duration:

The amount of pre-recorded video that will be associated with a user request for recorded video. This will allow the Camera Server to capture video prior to the user request, as well as after the request. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes.

ii) Frame Rate:

Video quality required for user activated recording. It shall be possible to have different frame rates for user and event-activated recordings. Shall be selectable from the entire range of frame rates supported for the camera. For MPEG encoding, support shall be provided to record only the Index frames, or a subset of the Index frames.

iii) Record Duration:

User activated recordings shall terminate after this period. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes

iv) Retention Period:

The default period that the Camera Server shall retain user-activated recordings before being deleted. The retention period of individual recordings shall be able to be changed on a per-recording basis. Shall be selectable from a list of values ranging between one hour and forever.

g. Event Activated

There shall be at least four priorities of alarms/events in the Security or Control System:

a. Event (journal priority)
b. Low priority alarms
c. High priority alarms
d. Urgent priority alarms

The following settings shall be individually configurable for each alarm and each camera:

i) Pre-Record Duration:

The amount of pre-recorded video that will be associated with an alarm/event. This shall allow the Camera Server to capture video prior to the alarm/event, as well as after the alarm/event. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes.

ii) Post-Record Duration:

Event activated recordings shall terminate after this period. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes

iii) Frame Rate:

Video quality required for event activated recording. It shall be possible to have different frame rates for user, event-activated, scheduled and motion detection activated recordings. Shall be selectable from the entire range of frame rates supported for the camera/streamer. For MPEG encoding, support shall be provided to record only the Index frames, or a subset of the Index frames.

iv) Retention period:

The default period the Camera Server will retain event-activated recordings before being deleted. The retention period of individual recordings shall be able to be changed as necessary. Shall be selectable from a list of values ranging between one hour and forever.

The pre-record and post-record durations in the paragraph above define the maximum allowable limits for each camera. They shall be configured on a camera-by-camera basis. However each alarm or event causing video to be recorded shall also be capable of individual configuration with pre and post alarm periods being selected from a range defined by the maximum settings for the camera.

DVRMS systems requiring a single pre and post record event period to be defined for all alarms and events on an individual camera are not acceptable. DVRMS systems requiring a single pre and post event period to be defined for all alarms and events on all cameras are also not acceptable.

In the case of multiple alarms/events relating to the same camera, a video clip shall be created for each alarm/event.

For cameras that support Pan/Tilt/Zoom Preset, a specified preset location shall be selected automatically when the alarm/event occurs prior to the event activated recording commencing. For example, when an alarm is detected on a

security door, the alarm shall trigger a PTZ camera to move to a preset position, which is pointing at the door prior to the DVRMS commencing recording.

h. Scheduled

The system shall support the ability to schedule recordings for each individual camera for times in the future. For each scheduled recording the user shall be able to configure the following (with descriptions as per User Activated and Event Activated recordings):

1. Start time
2. Stop time
3. Frame rate for the recording
4. Retention period before the recording will be deleted
5. Recurrence (if this is to be a recurring schedule)
6. Description (at least 255 characters)

There shall be no limit on the number of schedules that can be entered for the system. There shall be no limit to the number of schedules per camera.

i. Continuous background recording

The system shall support the ability to provide continuous background recording from any camera(s) managed by the system. Background recordings will be stored as a discrete series of clips and will continue to operate in the event that communication between the Camera Server and the Database Server is lost. Once communication is restored, all relevant information will be updated to the Database Server.

For each camera the user shall be able to configure the following (with descriptions as per User Activated and Event Activated recordings):

1. Enable / disable background recording
2. Duration of the recorded clip
3. Frame rate for the recording
4. Enable / disable archiving of the clip and the period after which to archive
5. Retention period before the recording will be deleted
6. Enable or disable audio recording (if available)

Systems that require the configuration of multiple time periods to manage background recordings will not be accepted. Continuous background recordings will not be dependent on network communications between the Camera Server and the Database server. Once configured, these recordings will continue to operate in the event that this communication is lost.

j. Video analytics

DVRMS system must be able to activate recordings automatically based on events generated by the real-time analysis of video from any camera on the system that has Video Analytics enabled. The real time analysis comprises several algorithms.

2.3.13.9 Video Motion Detection

The DVRMS system must be able to support video motion detection algorithms, which can be executed by the video streamer or the Camera Server. The enabling of Video Motion Detection shall be either:

i) On a continuous basis
ii) Scheduled for particular times, dates, days, months etc.
iii) The Camera Server-based algorithm must be able to provide the following functionality:

a. Detect and track objects
b. Learn the scene
c. Adapt to a changing outdoor environment
d. Ignore environmental changes including rain, hail, wind, swaying trees and gradual light changes

The operator shall be able to configure the following parameters for each camera:

i) Detection Type:

Continuous or scheduled

ii) Actions to Perform When Motion is detected:

The following actions shall be performed automatically:

iii) Generate an alarm in the Security System, Building Control System or Industrial Control System of configurable priority (journal, low, medium, high) Start a recording, with the following configurable settings

a) Pre-Record Duration:

The amount of pre-recorded video, allowing the Camera Server to capture video prior to the detection of motion, as well as after the detection of motion. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes.

b) Post Record Duration:

Motion detection activated recordings will terminate after this period. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes or until motion has stopped.

c) Frame Rate.

Video quality required for motion detection activated recordings. Shall be selectable from the entire range of frame rates supported for the camera/streamer. For MPEG encoding, support shall be provided to record only the Index frames, or a subset of the Index frames.

d) Retention period.

The default period that motion detection activated recordings will be retained by the Camera Server before being deleted. The retention period of individual recordings shall be able to be changed as necessary. Shall be selectable from a list of values ranging between one hour and forever.

e) Send video to an operator station or alarm monitor: Automatically switch an operator station or alarm monitor to view the camera which has motion detected

iv) Motion Finished Time: The amount of time where no motion (inactivity) is detected before the previous motion is classified as completed. This shall be used for allowing recordings to continue until motion has finished.

The DVRMS must provide a means of automatic and manual tuning of the Video Motion Detection for each camera. Incorporated within this tuning are the following:

a. Selection of the frame rate used for detection
b. Optimization for directions of movement in any direction
c. Across the camera view
d. Towards and away from the camera
e. Sensitivity level to fine tune the motion detection algorithm
f. Specification of a minimum object size to allow noise filtering in the system to reduce false detections and alarms.

v) The DVRMS must also provide the ability to only detect motion in particular regions of the camera view. The ability to graphically select these regions using the mouse must be provided, with an unlimited number of regions permitted per camera. The regions of interest will be multiverticed shapes with a minimum of 6 vertices to allow the region to be properly matched to the scene being detected. It shall be possible to add and remove vertices from the defined region of interest as needed. Solutions providing only rectangular regions of interest will not be accepted.

Each region must be able to be individually tuned and have separate tuning parameters. This method of tuning must also provide a live tuning window whereby these settings and regions can be altered and tested prior to be being used. This live tuning window shall show the live video as well as the regions of interest. During the time that motion is detected within a region, the border of the region shall change to a different color. In this way, tuning can be performed to achieve the desired performance. Text shall also be provided in the window to alert the user that motion has been detected.

2.3.13.10Cameras:

i) The cameras shall be rugged high speed PTZ dome cameras with inbuilt PTZ driver unit & RS 485 receiver unit, 1/4 inch image format fully performance color CCD dome cameras. These cameras should provide high resolution and high sensitivity suitable for operation in a power plant, both in natural and artificial sighted areas.

ii) The cameras should have features as mentioned below:

1. Suitable for night-time surveillance.
2. Manual or Automatic colour/infrared switching.
3. Automatic picture enhancement to give a balanced picture where there is too little/too much light.
4. Remote camera setup, with on screen menu display.
5. Back light composition
6. Automatic white balance, with mode selection options
7. Contour correction and contrast compression control.
8. Synchronisation selection for Gen lock, external V-lock, mains lock and internal free-running.
9. Cameras provided with auto IRIS lens, low lux density (0.1 lux) suitable for functioning in darkness (night shot capability) and Infrared illuminator.

iii) Detailed technical specifications are as under:

a) Imager Supply Interline transfer CCD, ¼" image format.
b) Horizontal resolution 470TVL in PAL B mode.
c) Sensitivity (at f1.6-3.7) - 1 lux
d) Light Range
e) Signal-to-noise: >48dB.
f) Dome Size 4.8"
g) Pattern: 4 pattern, 240 s memory
h) Optical Zoom 25 X
i) Digital Zoom 8 X
j) Power : 240V A C (From Bidder's UPS)

iv) Camera Housing

a. All the cameras and accessories are to be housed in Weather Proof environmental housing made of aluminium. The housing with heater and blower installed should provide protection for camera/lens assemblies in the ambient temperature range of - 0 deg. C to 60 deg.
b. The housing should also have thermostatically controlled heater kit, continuous duty blower kit, purge air arrangement, Window wipers available within the housing.
c. The minimum protection standard for cameras shall be IP 65.
d. The camera for FOPH and Fuel oil tank area shall be explosion proof type

2.3.13.10.1Operational requirements:

i) The CCTV system should comply with the following operational requirement.
ii) From the master control panel (keyboard) it shall be possible to select any camera and display the picture on any of the monitors.
iii) Commands from the video server is sent via an onsite receiver/drive unit to the camera which in turn controls the pan/tilt zoom etc., functions.
iv) Operator shall be able to control all the cameras, pan / tilt and zoom functions automatically.
v) The video recorder shall record the activities of all the places where alarm have been alerted. The recording time shall be as per the hard capacity as mentioned in the camera server specifications.

2.3.13.11Cables:

2.3.13.11.1Network Cabling

A separate Local Area Network (LAN) shall be provided for communication between the system elements. All interfaces to the LAN shall be a minimum of 1000BaseTX Ethernet. The LAN may use additional technologies within the backbone for greater speed or distance. Acceptable types are:

1. FDDI
2. 100BaseFX
3. 1000BaseSX or 1000BaseLX Gigabit Ethernet
4. Asynchronous Transfer Mode (ATM)

The LAN shall use standard network cables. Acceptable cable types are:

1) Optical Fiber
2) Category 5e or Category 6 Unshielded Twisted Pair (UTP).

The LAN shall be logically and/or physically separate from any existing LAN infrastructure. Interconnection to other LANs shall be through one of the following:

1. A router
2. A Layer 3 capable network switch
3. As an additional VLAN to the existing LAN equipment. Where required to interconnect VLANs, a router or Layer 3 capable switch shall be provided.

Special Requirements: - In addition to above requirements, the design of the plant security & surveillance system's LAN shall also meet the technical requirements stipulated for Station LAN at cl.no. 2.3.4.49, Chapter 4, Vol. II.

2.3.13.11.2Video Cabling

Where standard CCTV cameras are used, RG59/RG11/RG6 coaxial cable or optical fiber shall be used to connect the camera to a video streamer. Video streamers shall be located at locations closest to the CCTV cameras. In a new installation it is not acceptable to install a star topology video cabling system with all cabling coming back to a single location.

It is not acceptable for video cables to be run back to the Camera Server. All communications with the Camera Server shall be via the LAN.

Each network camera or video streamer shall have a single network interface to be used for video and Pan/Tilt/Zoom communications.

Cables should be suitable for installation as follows:

a. Above ground in open-air location (tray/ducts) in tropical, humid and corrosive atmosphere prevalent in thermal power plant.
b. Direct buried in underground trenches conduits with uncontrolled back fill and possibility of flooding by water and chemicals.
c. Laid underground in RCC lined cable trenches with possibility of flooding by water.
d. Site condition for cables laid above/underground shall be specified in the BOM. If not specifically mentioned therein, the design ambient air temperature of 75 deg. C ground temperature of 40 deg. C, thermal resistively of soil at 150 deg. C cm/watt and altitude and exceeding 1000, above main sea level shall be considered.
e. Cables of reputed make with approval of Owner shall be tested at works as well as site after installation as per applicable standards. All the required cables shall be supplied on as required basis. Further, 500 meters of each type of cables shall be provided as spare.
f. Fiber optic cables are to be provided whenever the cable run length/ signal loop length is more than 500 meters.
g. All the cables are to be provided by the Bidder on as required basis within his quoted lump sum price.
h. All the cables shall be laid thru GI conduit pipes or suitable grade permanently lubricated HDPE protection pipe as per IS 4984, IS 12235 & TEC.G/CDS-08/01 of suitable size @53% fill factor.
i. To avoid any type of external signal interference with CCTV system signals, all type of protection & hardware shall be provided by bidder.

2.3.13.12 Contract Quantities

Cameras along with inbuilt motorized zoom lens and PAN & TILT mechanism.

S.No.	Locations	No.	Camera type	Protection class
1 a.	TG hall Building	10	Dome Type high resolution CCD Cameras	IP65
1 b.		10	High resolution CCD Cameras	IP65
2	Boiler area	16	High resolution CCD Cameras	IP65
3	ESP / VFD Field area	8	High resolution CCD Cameras	IP65
4	CER	4 / CER	High resolution CCD Cameras	IP65
5	Control room	2 / CCR	High resolution CCD Cameras	IP65
6	Cable Gallery (at different areas)	16	High resolution CCD Cameras	IP65
7	Switch Gear & Battery room	6	High resolution CCD Cameras	IP65
8	Transformer Bay	10	High resolution CCD Cameras	IP65
9	PRDS & Deaerator	4	High resolution CCD Cameras	IP65
Common Plant Areas				
10	Ash slurry pump house	2	Dome Type high resolution CCD Cameras	IP65
11	Ash water pump house	2	Dome Type high resolution CCD Cameras	IP65
12	Chimney	1 / Chimney	High resolution CCD Cameras	IP65
13	CW pump house & Fore bay	3	Dome Type high resolution CCD Cameras	IP65
14	FOPH	2	Dome Type high resolution CCD Cameras	IP65
15	Main entry gate	4	High resolution CCD Cameras	IP65
16	Cooling tower	1	High resolution CCD Cameras	IP65
17	PT plant	2	High resolution CCD Cameras	IP65
18	RO / DM plant	3	High resolution CCD Cameras	IP65
19	Switch yard	5	High resolution CCD Cameras	IP65
20	Coal Handling Plant	10	High resolution CCD Cameras	IP65
21	AHP Control rooms	1	High resolution CCD Cameras	IP65
22	Effluent Treatment Plant Control Room	2	High resolution CCD Cameras	IP65
23	Stores	6	High resolution CCD Cameras	IP65
24	Ash Silo Area	1	High resolution CCD Cameras	IP65
25	Vehicle Parking area	4	High resolution CCD Cameras	IP65
26	Fire water Pump House	1	High resolution CCD Cameras	IP65
27	Raw Water Pump House	2	High resolution CCD Cameras	IP65
28	Sea water Intake / treatment Plant Control Room	2	High resolution CCD Cameras	IP65

29	Service Building	4	High resolution CCD Cameras	IP65
30	Other areas to be decided during Detailed Engg. Stage	12	High resolution CCD Cameras	IP65
31	Perimeter Intruder Detection System	30 nos. *	High resolution CCD Cameras	IP65
•	**Minimum with the condition that camera shall be provided at every 200 meter distance.**			

The following items shall be provided

SNO	ITEM	QUANTITY
1	Redundant Database Video Management Server	Two (2) no.
2	Camera Server	One no. for main plant control room and minimum seven nos. for common areas*
3	Operating work Stations	Two (2) nos.
4	Inter Connecting Cables	On as required basis without any cost implication to owner.
5	LED TV / Monitors Full HD with work station controller and PTZ controllers.	Seven (7) nos. 32"and Four (4) nos. 40" of latest version with advanced features and minimum requirements mentioned for 55" LED TV

* Common areas shall include Office of Chief Engineer/Head of the Project, Office of O&M in charge, Central Fire Station, Water system Control Room, Ash handling system control room, Main Gate of the Plant, any other location to be decided during detailed engineering

One (1) Set Hardware and Software for interfacing with Large Video Screens (LVS) for each of the units are to be provided.

2.3.13.12.1List of Makes

1) Digital Video Management Software: Same as that of DCS/DDCMIS software
2) Database & Camera Server: IBM/DELL/HP
3) CCTV Camera: Axis/Pelco/DVtel/BOSCH/Honeywell/ Polixel
4) IP Encoders/Streamers: Axis/Pelco/DVtel/ Polixel
5) LAN Cable: Tyco/RNM/Amp
6) ~~Coaxial Video Cable: Fusion Polymer/Skytone/CCI~~

2.3.13.13Security Card Access System

2.3.13.13.1General

Purpose of the facility is to control access to all vital areas within the important plant buildings by electronic card reader system.

Access system cards shall be suitable for individual configuration of access privileges via access control software for controlling access to different locations. Biometric detection system is preferred. However, Bidder can offer other suitable systems also.

Access controlled area entry/exit doors shall be fitted with Electro-magnetic locks. Access card reader shall be proximity card reader type.

The card access system shall have a dedicated redundant server to record all entries and exits through the card access locations. However the actual location shall be derived during detailed engineering

a. Central Control Room
b. Local Control Rooms (including all BOPs)
c. Water Treatment Plant
d. Workshop
e. Stores
f. Switchgear Rooms
g. Main Entrance and Exit of Plant
h. Administration building entrance and exits.
i. Service building entrance and exits.
j. Laboratories

The card access system shall comprise of the following:

a. Access card readers at all above locations and 20% extra locations shall also be considered.
b. Access cards for 1000 persons.
c. Necessary software suitable for accommodating 1500 access cards.
d. Redundant servers with one no. operating work station & A4 sized color printer.
e. Specification of servers, Operating work stations & printers shall be same as specified at chapter 4, Vol. II with 29" sized LED monitors.

2.3.13.14Patrol Guard System

Purpose of the system is to ensure that security guards on patrol duty are carrying out their duties diligently by recording the visiting time data for different locations.

The system shall comprise of a selected number of proximity card readers located in various strategic locations of the Thermal Power Project including the perimeter. The patrol guard recorder will record the date and time when the recorder is swiped on the magnetic strips.

The recorders shall be suitable for downloading the data in total work station.

The system shall be flexible to allow for addition/deletion or movement of monitoring locations.

Al least ten (10) nos. card readers shall be provided. Guard locations to be considered as 100 nos.

components. It shall be ensured that failure of this network component(s), shall in no way affect individual unit's operation monitoring & control in any way.

2.3.4.26 Specifications for Operator Station, Engineering Work Stations

Each operating station & Engineering work stations and any other work stations / PC envisaged in plant shall meet following minimum requirements & as per latest trends at the time of supply:

1. On board Intel – Xeon quad core, 3.46 GHz processor with 1066 MHz bus with Hyper threading or higher.
2. 4GB DDR3 RAM (min.)
3. 1 x 1000 GB IDE Hard Disc Drive of 7200 RPM or higher
4. 1024 MB Graphic Accelerator
5. System chipset: Intel Express
6. 2 x RS – 232 ports
7. 1 x parallel port
8. 4 nos. USB ports. (2 nos. on front side)
9. 1 x 52 X DVD / CD Read Drive
10. 16 X DVD R / W Drive
11. 2 x Ethernet (10 / 100 / 1000MB) cards (Industrial Grade)
12. UXGA graphics and monitor 1920 X 1248, 256 colours with MRPII compliant, viewing Angle 178° vertical & Horizontal and fastest response time.
13. 1 x windows XP/7 Professional or latest & proven version of Windows OS Professional with Multimedia
14. Ethernet adapter
15. Third party operating system, graphical users interface and software, if required.
16. 2 nos. graphic output cards minimum
17. Optical mouse
18. Sound card
19. Internal speakers
20. Wireless internet & Blue tooth Interface
21. Redundant power supply (In built)
22. General MS Windows latest, MS-Office Professional, Adobe Acrobat, anti-virus McAfee or equivalent, AutoCAD etc.
23. Application engineering & HMI software to suit project Specific requirement
24. All OWS shall be interchangeable

Preferred makes of OWS / EWS / PC's are DELL, HPCOMPAQ, NEC & IBM.

2.3.4.27 Peripherals for Operator Station, Engineering Work Stations & Server System

a) Full flat monitors with LED back lighting

The bidder shall furnish OWS / EWS / Servers / PC with coloured full flat monitors with LED back lighting. OWS / EWS / Servers / PC with Monitors shall have a fast cursor control device like a track ball / optical mouse. All Monitors shall be of high resolution colour graphics type

and with not less than 32 colours. The picture frequency shall not exceed 85 Hz. The resolution required is 1920 X 1248 pixel or better. The picture shall be stable and completely free of any flickering. The screen illumination shall be enough to give good readability. The screen dimensions shall not be less than 24" screen diagonal.

Antiglare hard coating shall be provided. High reliability and long life 24" (Industrial type) or better size monitors shall be supplied by the bidder. Monitors shall be equipped with all adjusting elements accessible on the front plate. Monitors with 3D capabilities for graphics shall be provided by bidder.

Monitors along with keyboard & optical mouse shall be mounted on supervisory control console specified elsewhere in the specification.

b) Key Board

Functional key boards for plant operator station shall be of special type adopted to operation tasks and monitor functions. It shall contain all keys necessary for plant operation arranged in an ergonomically manner. Multifunction keys shall be provided with automatic display for modified functions. Freely programmable keys (Minimum 101) shall be available for special user application.

Key Board shall be integrated into supervisors control consoles horizontal part.

Provision of functional keyboard shall be in addition to facility for operator control through mouse / track ball.

Membrane type keyboard shall be provided for operator interface with process for plant control and display functions to access plant data in conjunction with control OPERATING STATIONs. Membrane keypad shall be assignable with LED alarms, dedicated display selection keys with spare provision, hardware locking facility to set OPERATING STATION in engineer, supervisor or operator mode. The keyboard shall have a minimum of 101 configurable keys for assigning most frequently used displays. A minimum of forty of those keys shall have two independently lit LED's used for event-specific alarm annunciation.

Keyboard shall be provided to enable the shift supervisor to develop graphic displays, control system software and system configuration for the DDCMIS. It shall be possible to perform operating interface functions from engineering OPERATING STATION. Assignable function keys shall be provided for execution of command, program etc. Hardware facility shall be provided to set OPERATING STATION in engineer or operator mode. QWERTY type keyboard shall be provided for engineer's functions. QWETRY type Key Board may be offered alternatively for OWS.

c) Printers - Line Impact Heavy Duty Dot Matrix Printers

All printers shall be low noise (less than 60dB) type with a minimum of 136 columns. Printing speed shall be a minimum of 300 characters per second. Since the control room printers are

high-speed printers, the system shall output to these printers at the rate of 1000 lines of printout per minute as a minimum. This rate shall be independent of the number of printers in simultaneous operation. Style of printing available shall be indicated by the Bidder. The printers shall have graphic capability and any OPERATING STATION display may be printed on the printer. The printing shall be bi-directional and in two colours black and red for sequence of event recording. Paper input capacity shall be with continuous paper feed.

Printers shall accept and print all ASCII characters via an E.I.A.RS-232C or twenty milliamp current loop interface. Parity checking shall be utilized. All printers mounted shall be provided with a separate printer enclosure each. The enclosures shall be designed to permit full enclosure of the printers at a convenient level. Plexiglas windows shall be used to provide visual inspection of the printers and ease of reading. Printer enclosures shall be designed to protect the printers from accidental external contact and each should be removable from hinges at the back and shall be provided with a lock at the front. If one of the printers fails to operate, its functions shall automatically be transferred to the other printer. Failure of the printer shall be indicated on all operating stations. Printer shall be offered and supplied from reputed manufacturer with latest proven technology. 5 Rims of papers of highest size (A3/A4 of the respective printer) shall be provided by bidder for each printer provided with subject plant.

Coloured Laser Jet printer		
S.No	**Features**	**Essential / Minimum requirements**
1	Printing speed	20 ppm (min.)
2	Resolution	1200 X 600 dpi
3	Memory	128 MB (min.)
4	External Port	1 no. USB 2.0 port, and TCP / IP 10 / 100, Ethernet, Blue tooth interface
5	Duty Cycle	40,000 pages per month
6	Pages size	A3, A4, and Transparency etc. with automatic duplex printing facility

Laser Jet printer (B & W)		
S.No	**Features**	**Essential / Minimum requirements**
1	Printing speed	30 ppm (min.)
2	Resolution	1200 X 1200 dpi
3	Memory	128 MB (min.)
4	External Port	1 no. USB 2.0 port, and TCP / IP 10 / 100, Ethernet, Blue tooth interface
5	Duty Cycle	15,000 pages per month
6	Pages size	A3, A4, and Transparency etc. with automatic duplex printing facility, Paper Tray – 2 nos

Ink Jet Printers (Coloured)		
S.No	**Features**	**Essential / Minimum requirements**
1	Printing speed	30 ppm (min.)

2	Resolution	1200 X 1200 dpi
3	Memory	64 MB (min.)
4	External Port	1 no. USB 2.0 port, and TCP / IP 10 / 100, Ethernet, Blue tooth interface
5	Duty Cycle	5,000 pages per month
6	Pages size	A4, Transparency etc.
7	Duplex Printing	Automatic

Scanner, Copier cum Printer (A3 size) - Ink Jet Printers (Coloured)		
S.No	**Features**	**Essential / Minimum requirements**
1	Resolution	1200 x600 dpi (optical) (min) for Printer & 600 x600 dpi (optical) (min) for Scanner
2	Colour Depth	48 bit
3	Scaling	10 to 2000% in 1% increments
4	USB interface	Required
5	Memory	1 GB
6	Printing Speed	30 ppm (min.) for A4 size & 20 ppm (min) for A3 size
7	Duplex printing	Automatic

Five sets of print cartridges and five rims of papers shall be provided with each printer provided anywhere in the plant by bidder with each DDCMIS, DCS & PLC system and any other system specified elsewhere in specification.

Preferred makes of printers are HP, Canon, Fuji Xerox, & Epson.

d) External DVD/CD Drive

The external DVD/CD drive is a back-up device. The external DVD/CD drive shall have read/write capability and shall be provided with all required hardware interface including error detection and correction facilities.

Features

1. Supported Formats: DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-ROM, DVD-video, CD-R/RW, CD-ROM/XA, CD-ROM, Audio CD, VCD, CD-I(FMV), Photo CD, CD-EXTRA, CD-TEXT
2. Write Speed: 8x DVD+R, 4x DVD+RW, 24x CD-R, 16x CD-RW
3. Read Speed: 24x CD-ROM, 8x DVD-ROM
4. Compliant with USB 2.0 High-Speed (480Mbps)
5. Bootable on OWSs/Laptops
6. Memory buffer size: 2MB minimum.
7. Powered by an additional USB power cable for best speed. (Requires one more USB port available)
8. Can be powerless (only connected by the USB data cable).

9. Plug & Play and hot pluggable.
10. Portable Design.

Five nos. Boxes of DVD (Re-writeable) shall be provided with each external DVD/CD drive provided.

e) External DAT Drive

The DAT drive is a serial back-up device. The DAT drive shall have read / write capability and shall be provided with all required hardware interface including error detection and correction facilities in each control room. The tape (total 10 nos.) of Sony make shall have the capacity of 12 / 24 GB min. The tape drive shall be specified as follows:-

- DC drive
- Tape format - QIC-80
- Data Transfer Rate – 5MB / minute.
- Seek time – 22 milli second

f) Hard Copy Facilities

The system shall be capable of copying hard copy of OPERATING STATION graphics through a video colour copier switch able to any OPERATING STATION.

The printer / copier offered shall be capable of copying OPERATING STATION image in 20 seconds.

g) USB Port Pen Drive

Twenty Five (25) no. USB Port pen drive having 32GB / 64GB memory with read / write facility shall be provided. Preferred makes of USB pen Drive are HP, SanDisk, Kingston, and Strontium.

h) Scanner, Copier cum Printer (A3 size)

S.No	Features	Essential / Minimum requirements
1	Resolution	1200 x600 dpi (optical) (min) for Printer, 600 x600 dpi (optical) (min) for Scanner
2	Colour Depth	48 bit
3	Scaling	10 to 2000% in 1% increments
4	USB interface	required.
5	Memory	1 GB
6	Printing Speed	30 ppm (min.) for A4 size, 20 ppm (min) for A3 size
7	Duplex printing	Automatic

i) DVD Writer

The DVD writer should be capable to read and write any DVDs as well as CDs. and shall be provided with all required hardware interface including error detection and correction. The DVD writer shall meet following minimum requirements:

DVD write speed - 16x
CD write speed - 52x
Cache / Buffer size - 2MB
Buffer under protection technology

Five nos of DVD (Re-writeable) shall be provided with each OWS / server provided anywhere in the plant by bidder with each DDCMIS, DCS & PLC system and any other system specified elsewhere in specification.

j) Digital B/W Copier cum Printer (A3 size)

Digital B/W Copier cum Printer (A3 size)		
S.No	**Features**	**Essential / Minimum requirements**
1	Type	Laser, table top / latest
2	Printer memory	512 MB (Min.)
3	Speed	Monochrome 30 ppm - A4, 20 ppm – A3
4	Resolution	600 x 600 DPI
5	No. of color (Basic)	Monochrome
6	Duty cycle	Monochrome more than 75000 pages / month
7	Power supply	240 V, 50 Hz, 1 phase UPS
8	Ambient temperature	0-50° C
9	Humidity	95% non-condensing
10	Size of paper	Paper weight of 45 to 165 g/M2
11	Networking Capability	USB / Ethernet
12	Coping	Max Original Size – A3, Continuous Coping (1-999)
13	Accessories	1. Adapters 2. Connector Cable 3. Duplex Unit. Automatic 4. iv) Optional Paper feeder- 2 Nos

k) Lap Top

All the Laptop will also be used as pluggable temporary Engineering/programmer's station and operator station functionalities of the Engineering/programming stations mentioned in the

specifications shall be provided (including requisite license).

a) Intel CentrinoTM Mobile Technology.
b) Intel Core – vpro latest generaton Processor with 3.46 GHz, 4 MB L2 cache,1066MHz FSB.
c) 14" WXGA LED Screen with wide angle viewing.
d) 1000 GB 7200 rpm HDD with shock absorber.
e) 8 GB 800 MHz DDR3 SDRAM (slot for 1no. additional RAM slot should be provided)
f) 1 x windows XP/7/8/10 Professional or latest & proven version of Windows OS with Multimedia
g) Slim type DVD-RW/DVD ROM combo drive.
h) Internal 10/100/1000Mbps Ethernet card
i) IEEE 802.11B connectivity port
j) IR port - Optical mouse
k) 2Nos. USB 3.0/2.0 or latest version ports & Wireless INTERNET & blue tooth Interface.
l) External mouse connectivity and optical mouse
m) Minimum 8 hrs battery backup.
n) Recovery software tools.
o) Sound cards
p) Internal speakers -General MS Windows latest, MS-Office Professional, Microsoft Visual Studio, Adobe Acrobat, anti-virus McAfee or equivalent, etc.
q) Application engineering & HMI software - to suit project specific requirement.
r) Carry Bag, Power Adapter.
s) 1024 MB Graphic Accelerator

Preferred makes of Laptop are DELL, HPCOMPAQ, VAIO (Sony), Lenovo.

l) General Specification of the server:

S.No	Features	Essential / Minimum requirements
1	Enclosure	6U Rack Mountable server / Tower type Sever
2	Processor	Intel Xeon Quad (4) Core 64 bit, Processor capable 3.6 GHz with 16MB L3 cache memory per processor, Dual independent 1333 MHz system bus (2 way SMF) or better
3	Memory	64GB ECC DDR – 3, 800 SDRAM
4	Video	Integrated with 64MB SDRAM
5	Resolution	1920 x 1248
6	Drives	i. HDD – RAID 5 (1000 GB) ii. Ultra 320 SCSI adaptors with internal storage capacity 3.6 TB iii. DVD/CDROM – 24X CD – RW/DVD IDE combo iv. USB – 4 ports v. DAT – 36 / 72 GB
7	Peripherals	PS/2 keyboard & Optical Mouse
8	Operating system	Windows 2008 server version standard / latest Enterprise Edition or latest & proven version of Windows Operating system

9	Backup & Disaster Recovery	VERITAS \ CA \ Tivoli \ any other
10	Environmental	Operating Temp range - 10°C to 35°C, Humidity range - 8 to 80% (Non-Condensing), Vibration 0.25 G at 3 to 300 Hz for 15 Minutes.
11	Software	General MS Windows latest, MS- Office Professional, Adobe Acrobat, anti- virus McAfee or equivalent, etc. Application engineering & HMI software - to suit project Specific requirement
12	Miscellaneous	i. 1 Parallel port ii. 1 Serial port iii. 4 – 10/100/1000 MB/1GB network ports iv. Two non-boards and two added v. External SCSI port vi. Dual hot plug power supplies vii. Dual Hot plug fans viii. 2 PCI Express slots (1x4 lane and 1x8 lane) ix. 2 PCI X slots (64bit/100MHz) x. 2 PCI slots (one 32bit/33MHz, 5V & one 64bit/66Mz) xi Redundant Server shall be provided, wherever required. xii. LED based 24" sized Monitors.
Preferred makes of OWS & Servers are DELL, HPCOMPAQ, and Lenovo.		

m) Graphic Interface Unit (GIU)

Minimum Specification of Graphic Interface unit shall be as follows:-

S.No	Features	Essential / Minimum requirements
1.	Power Supply	240 V AC from UPS thru redundant feeders.
2.	Display Size	15" minimum. (Industrial Grade) Actual size as per Owner's approval.
3.	Display Type	Color, TFT active matrix screens high resolution.
4.	Protection Class	IP-65.
5.	Keypads	Functional Key and numeric Keys.
6.	Interfacing Requirements	Interface with respective control system.
7.	Functional Requirements	Ability to programming. Graphic Display includes alarms and operator guidance messages.
8.	Enclosures	Required as per site/process requirements.
9.	Other requirements	GIU shall be ruggedly designed to withstand hard environments like high temperature, shock and vibration.
10.	Interfacing with control system	Redundnat
11.	Configuration	On board Intel – Xeon quad core, 3.1 GHz latest processor or higher. - 4 GB DDR3 RAM (min.) - 1 x 500 GB IDE Hard Disc Drive of 7200 RPM or higher - 1024 MB Graphic Accelerator - System chipset: Intel Express - 2 x RS – 232 ports

S.No	Features	Essential / Minimum requirements
		- 2 nos. USB 3.0/2.0 - 2 x Ethernet (10 / 100 / 1000MB) cards (Industrial Grade) - 1 x windows 7/8/10 Professional or latest & proven version of Windows OS professional with Multimedia - Ethernet adapter - Third party operating system, graphical users interface and software, - 2 nos. graphic output crads minimum - Internal speakers - Redundant power supply (In built) - General MS Windows latest, Antii-virus software etc. Application engineering & HMI software - to suit project Specific requirement

n) Technical specifications for 40” and 55" professional led tv display.

S.No	Features	Essential / Minimum requirements
	Display	
1.	Screen size	40 inches, 55 inches (LED based)
2.	Resolution	1920x1080 (16:9)
3.	Brightness	700 cd/m2
4.	Contrast ratio	3000:1
5.	Pixel pitch	0.53025(H) * 0.53025(V)
6.	Colours support	8bit – 16.7M
	Signal Input	
7	Video Signal	Analog D-SUB, DVI-D, Display port, CVBS, HDMI1, HDMI2, S-Video inputs.
8	Features	Lamp error detection, Brightness sensor, Anti Retention, Temperature Sensor, /RJ45 MDC, Built in speaker(10W + 10W), Plug and Play (DDC2B), PIP/PBP, Video Wall(10x10), Pivot Display, Button Lock, Digital Daisy Chain, Smart Scheduling, Smart F/W update.
9	Software	As required

o) Industrial grade managed type Ethernet switches

Industrial grade managed type Ethernet switches shall be provided with in built diagnostic features, 20% spare ports & inbuilt redundant 24 VDC power supply features and Integrated Security features (IPS, ACL, Firewall). Industrial grade managed type Ethernet switch shall be rack mounted and comply with the IEC 61850 (3) and IEEE 1613 requirements. Switches shall have 10 GB / 100 GB module support for future upgradeability

p) The Firewall shall meet following minimum requirements:

Industrial grade Firewall appliance should facilitate multi-vendor, multi-application

accordance with ISO 9000 quality standards this will include historic database records of all configuration changes, test and calibration details and additional service notes.

4. Automatic tracking of configuration changes made in the field, such as may be introduced by hand-held communicator. All configuration function associated with hand-held communicators shall be available in the system.
5. Event and log reports on screen as well as on printer.
6. Any addition / deletion of transmitter will be reported on printer and logged in hard disk.

The Bidder shall enclose detailed bill of material and schemes along with the bid indicating how the requirements of centralised configuration, maintenance, diagnostics and record keeping facility for transmitters are being achieved. The make of modules / devices and configuration scheme shall be subject to Owner's approval during detailed engineering stage.

In case bidder DDCMIS has the facility to acquire HART signals through analog Input cards and carry out the communication to HMS OWS through DCCMIS hardware, the same is also acceptable. In this case all above features & hardwares mentioned above cl.no. 2.3.4.45 shall be complied by integral HMS system.

For easy handling of the various functions at HMS panel itself, and Control & Instrumentation Laboratory, One no laptop PC with necessary advanced configuration as listed in specification elsew here, HMS software, one no industrial grade RS 485 / RS 232 converter shall be provided for configuration, maintenance and diagnostic of all smart devices. All the functions mentioned in above at cl. no. 2.3.4.48 (i) shall also be available in the laptop PC.

2.3.4.49 Station LAN

1. General

A plant wide Local Area Network (LAN) encompassing the different plant buildings shall be provided. The Station LAN shall interconnect the buildings together and shall facilitate the smooth transfer of Data from one building to the other.

2. Design and functional requirement

A Plant Wide Network shall be provided, so that pre-selected plant graphics & data can be viewed on real time data basis at selected nodes and from remote locations. The LAN shall be redundant with redundant industrial grade Ethernet switches and of the industrial grade with 10 Gigabit speed and shall utilize standard IEEE 806.3 protocols such as Ethernet. Complete network shall be provided with External surge protection system and industrial grade fire wall. The Station LAN connection with necessary RJ-45 connectors and other accessories shall be provided at cabins of each occupants in service building, administrative building, fire station building, Time office, Stores, and other buildings. The Station LAN shall connect following buildings:

a. Station building – Central Control Room
b. Service building
c. Central Stores

d. Simulator Room
e. Admin Building
f. Chief Engineer Room
g. Conference Room
h. Discussion Room
i. Training Room
j. Cooling water pump house
k. ESP Control room
l. Mill Plant Area
m. Regeneration building (CPU)
n. Any other plant area / building where STATION LAN need to be provided for the purpose of MIS.

The LAN network to be provided for all user's points in all the rooms in the buildings and within plant premises. Exact user points in each building and within plant premises will be decided during detailed engineering stage.

The various buildings shall be interconnected through the use of minimum 4 core single mode fibre and shall be connected to the main switch in the Service Building in a STAR topology.

Each building shall be provided with a 12.U high wall-mountable communications cabinet complete with glass door, 6 way power distribution unit, 6 shelves and force ventilation. All units are to be supplied with cage nuts and bolts to house LAN switches.

Industrial grade managed type Switches provided shall be minimum 4x fibre (10000 Base-SX) 10 Gbps uplink ports or 6.x STP (10000Base-T) 10 Gbps uplink ports Ethernet switch, configurable via browser interface and have a 50% spare capacity for future addition of LAN points. These switches shall also be provided with in built diagnostic features, inbuilt redundant 24V DC power supply features and Integrated Security features (IPS, ACL, and Firewall).

The LAN shall be designed in a manner such that failure of an individual switch shall not hamper the failure of the entire system

All provisions required for extending the Station LAN to Admin. Building shall be provided in main LAN switch.

Inter building wiring shall be a minimum of Category 5E STP cable manufactured, tested and verified to ISO11801 EIA / TIA standard. Internal building wiring shall be of the structured cabling type and shall incorporate patch panels on every floor or as required. Communication cables shall be armoured and routed through GI conduit pipes or suitable grade permanently lubricated HDPE protection pipe as per IS 4984, IS 12235 & TEC.G / CDS-08 / 01 of suitable size @53% fill factor.

A minimum of two RJ-45 ports shall be provided for each specified location Category 5E shuttered modules shall be used in pre-assembled faceplates to save installation time. Modules shall include a slide label system.

All the locations availing the operating stations namely FOPH, CWPH, Boiler A elevation, Turbine 0 meter, ESP, Ash handling Control room, HT Switchgear room, SWAS / Chemical Express lab and DM Plant etc. are to be air conditioned.

2.3.4.50 Intrusion Detection System (IDS) and Intrusion Prevention System (IPS) Features:

In order to inspect all inbound and outbound network activity and identify suspicious patterns that may indicate a network or system attack from someone attempting to break into or compromise a system on the Station LAN Network, the recommended IDS / IPS should contain the following combined features. Any feature can be selected depending on whether it is to be configured as IPS or IDS.

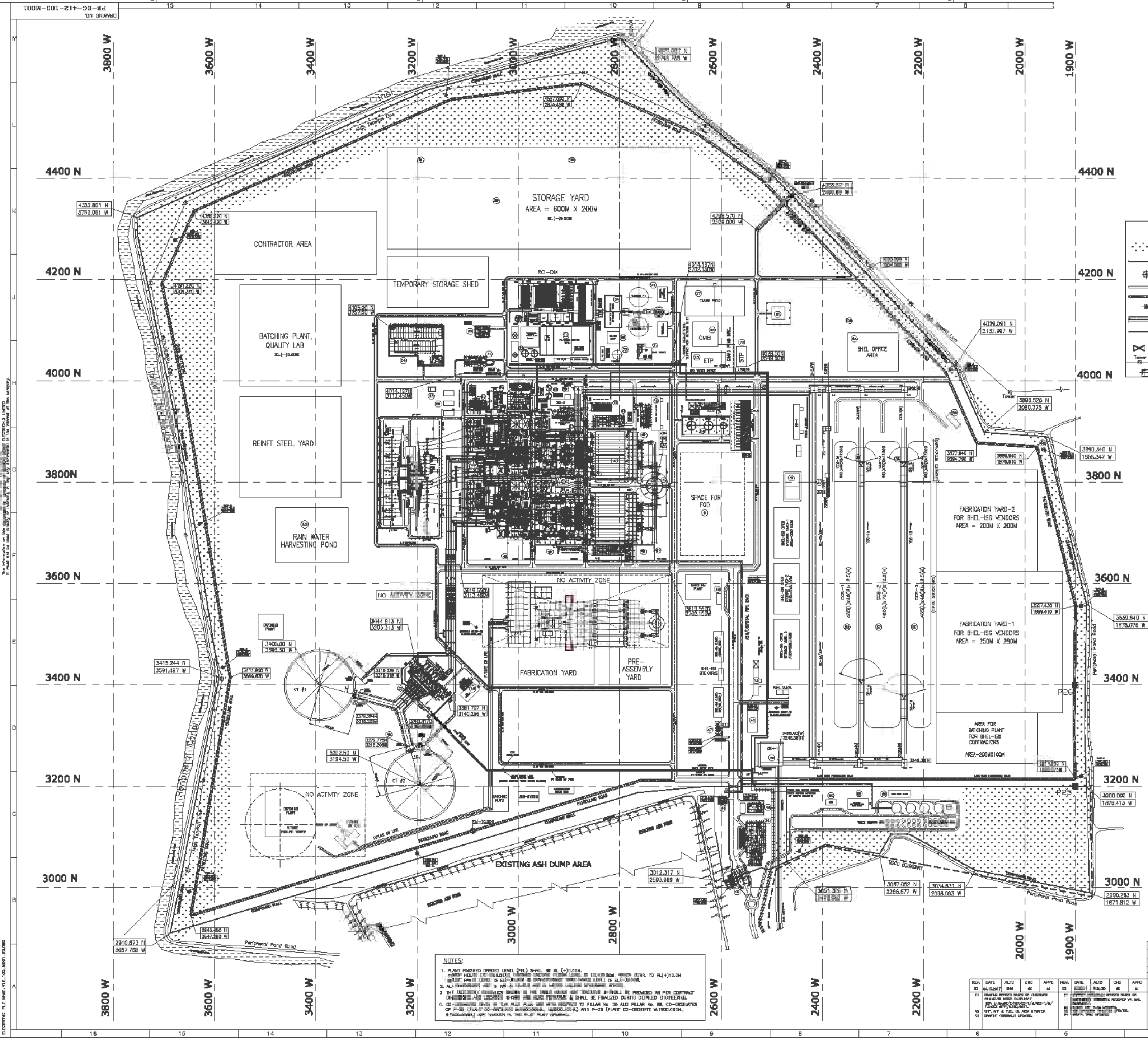
1. Able to analyse, detect and report on security related events.
2. Able to inspect traffic and to drop malicious traffic based on the configuration of security policy.
3. Able to inspect the content of network packets for unique sequences / signatures.
4. Able to detect and prevent known types of attacks such as worm or Trojan infections and hacks.
5. Able to prevent denial of service (DOS) and Distributed Denial of Service attacks.
6. Able to prevent abnormal behaviours by monitoring and learning normal network behaviours.
7. Keeps up-to-date on new threats and vulnerabilities.
8. Should provide user friendly interface to queries and reports on threats and event data so that security administrators can gain a better understanding of their ability to protect their network.
9. Should provide detailed activity logs for auditing.
10. Able to detect known threats via deep-packet inspection.
11. Able to defect unknown threats via anomaly scanning.
12. Able to detect unknown threats via behaviour pattern to protect from zero day attacks.

2.3.4.51 Network Management Software (NMS):

The network management software should contain the below mentioned features.

1. Graphical user interface (GUI) management.
2. Automated discovery and display of Ethernet topology and devices.
3. Real-Time SNMP Support
4. Monitor traffic flow through the device
5. View a device image indicating which ports are active and which modules are installed. It a particular network device is down, it should give the tools like ping / telnet options in the same screen to further diagnose the problem.
6. Real-time activity and utilization statistics and graphical trends.
7. Facility of providing pre-defined actions like e-mail, SMS etc. upon any event generated in the network.
8. Facility of viewing logical graphs of devices like routers, web servers, according to the needs.

The following parameters should be monitored.



NOTES:

1. PLANT FINISHED GRADED LEVEL (FGL) SHALL BE RL (+)0.00M. [illegible] TO RL(+)10.0M [illegible]
2. ALL [illegible]
3. THE [illegible] SHALL BE PROVIDED AS PER CONTRACT [illegible] & SHALL BE FINALIZED DURING DETAILED ENGINEERING.
4. CO-[illegible] TO PILLAR No. 25 AND PILLAR No. 26. CO-ORDINATES OF [illegible] AND P-26 (PLANT CO-ORDINATE W:1900.000M., N:[illegible]

LEGEND:

- GREEN BELT
- COMPOUND WALL
- HIGH MAST LIGHT FOUNDATION
- PLANT ROADS
- PIPE RACK
- WATCH TOWERS
- COAL CONVEYOR
- INTERNAL COMPOUND WALL
- GATES
- HIGH TENSION LINE
- SEWAGE COLLECTION PIT

IDENTIFICATION NUMBER	DESCRIPTION
1	TG BUILDING
2	SWITCH GEAR ROOM, CONTROL ROOM, AC PLANT ROOM
3	STEAM GENERATOR
4	ESP
5	CHIMNEY
6	SPACE FOR FGD PLANT
7	TRANSFORMER YARD
8	400KV GIS SWITCHYARD
8a	DG SET
8b	COMPRESSOR HOUSE
10	VACUUM PUMP HOUSE (UNIT-1) & COMPRESSOR HOUSE
11	BOTTOM [illegible] PUMP HOUSE
12	ASH WATER PUMP HOUSE
13	BUFFER HOPPER TOWER
14	FLY ASH SILOS
15	HFO/LDO UNLOADING AREA
16	HFO/LDO STORAGE TANK DYKE AREA
17	HFO/LDO F[illegible]
18	ELECTRO [illegible]
19	SEA WATER [illegible] PUMP HOUSE (OUTSIDE PLANT BOUNDARY)
20	FILTERED WATER AND FIRE WATER STORAGE TANK AND PUMP HOUSE
21	MILL REJECT SILO
22	RO-DM CUM DESALINATION PLANT(180MX80M)
23	DM STORAGE TANKS & PUMP HOUSE
24	STORAGE YARD (WITH COMPOUND WALL, COVERED STORES & OFFICE)
25	ETP
26	CENTRAL MONITORING BASIN
27	GUARD POND
28	GAS CYLINDER SHED
29	CP[illegible]
30	[illegible] PIT
31	[illegible]
32	SWITCH YARD CONTROL ROOM
33	CONVEYOR
34	ADMINISTRATION BUILDING
35	CANTEEN
36	NDCT
37	COOLING WATER PUMP HOUSE
38	STACKER CUM RECLAIMER
39	CRUSHER HOUSE
40	CHP CONTROL ROOM
41	DISPENSARY AND FIRST AID CENTER
42	ADDITIONAL CANTEEN
43	SERVICE BUILDING
44	DELETED
45	ESP CONTROL ROOMS
46	CONDENSATE STORAGE TANK
47	FIRE STATION
48	ROAD WEIGH BRIDGE BUILDING
49	MAIN GATE & TIME OFFICE CUM SECURITY COMPLEX
50	DOZER SHED & REPAIR SHOP
51	COAL PILE RUN OFF PIT
52	COAL STOCK PILE
53	AIR WASHER ROOM
54	BHEL SITE OFFICE
55	WATCH TOWERS
56	FIR[illegible] HOUSE
57	EM[illegible]
58	DELETED
59	DELETED
60	WEIGH BRIDGE BUILDING ASH SILO AREA
61	H_2 PLANT
62	RAIN WATER HARVESTING POND
63	CLARIFIER
64	CLARIFIED WATER STORAGE TANK(82.5MX33.0M)
65	SLUDGE SUMP
66	FIELD [illegible]
67	VAC[illegible] (UNIT-2)
68	FA [illegible] HOUSE
69	SILO UTILITY BUILDING
70	STP
71	AUX. BOILER
72	SERVICE WATER OVERHEAD TANK
73	CUSTOMER'S SITE OFFICE
74	CHEMICAL LAB(30MX20M)
75	MRS CONTROL ROOM

PROJECT	2x660MW ENNORE SEZ SUPERCRITICAL THERMAL POWER PROJECT AT ASH DYKE OF NCTPS, CHENNAI
OWNER	TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
OWNERS CONSULTANT:-	DESEIN PRIVATE LIMITED DESEIN HOUSE, NEW DELHI
EPC CONTRACTOR:-	BHARAT HEAVY ELECTRICALS LTD.

JOB NO. 412
STATUS CONTRACT
DISTRIBUTION

REV.	DATE	ALTD	CHD	APPD
01	20.02.15	SD	SH	AJ

01 DRAWING GENERALLY REVISED BASED ON CUSTOMER'S COMMENTS.

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

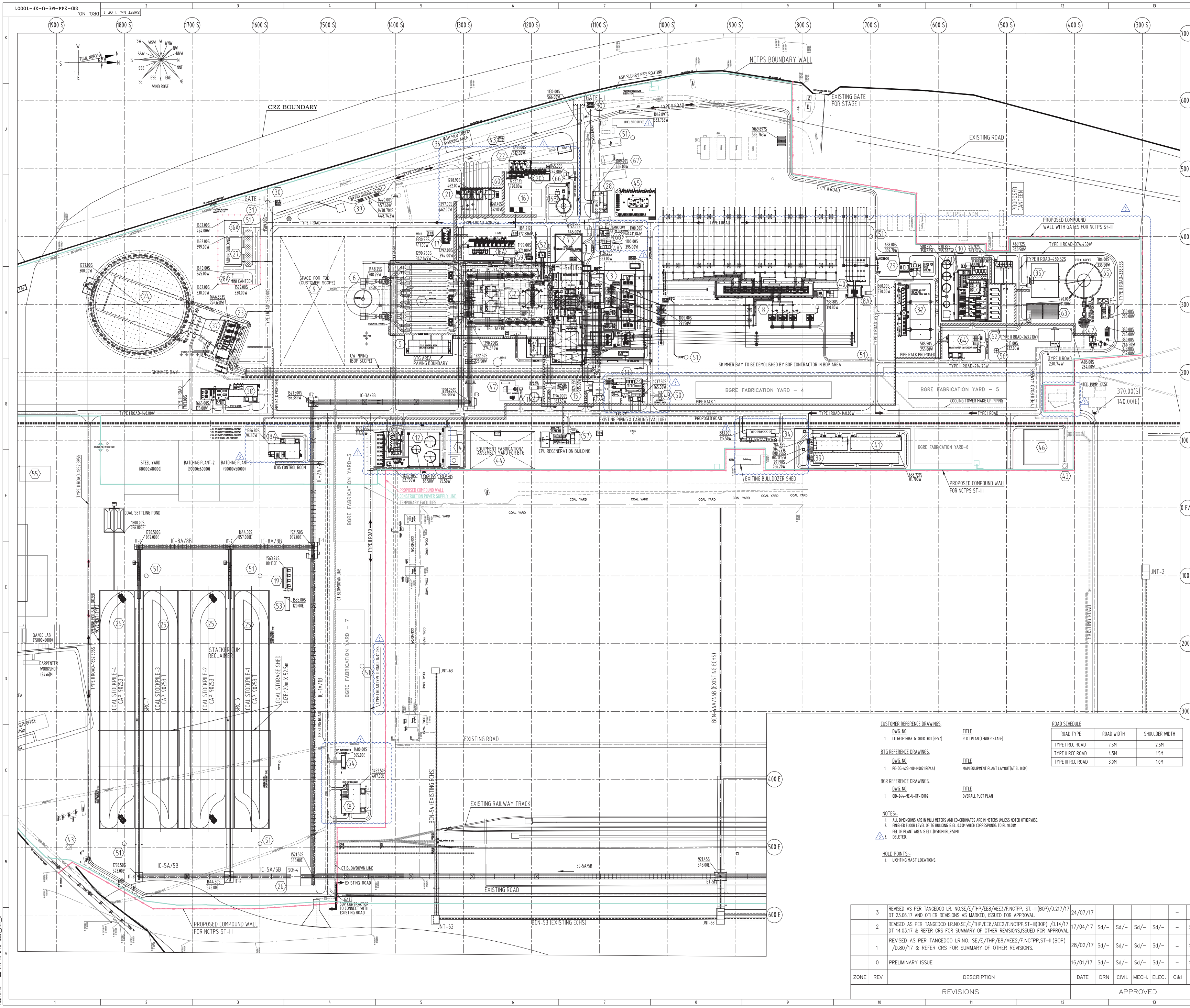
DEPT CODE		NAME	SIGN	DATE
M	DRN	SD	sd/-	28.10.2014
	DESH	SD	sd/-	28.10.2014
	CHD	SK	sd/-	28.10.2014
	APPD	AJ	sd/-	28.10.2014

TITLE

PLOT PLAN

SCALE: 1:2500
DRAWING NO PE-DG-412-100-M001
SHEET 1 OF 1 REV 03
FORMAT SIZE A0

FIRST ANGLE PROJECTION



S.NO.	UNIT	KKS CODE	STRUCTURE NO.	DESCRIPTION	REMARK
1	-	UMA	01	TURBINE GENERATOR BUILDING	-
2	-	UHA	01	STEAM GENERATOR	-
3	-	UBE	01	TRANSFORMER YARD	-
4	-	UHQ	01	ELECTROSTATIC PRECIPITATOR	-
5	-	UHQ	02	E.S.P. CONTROL ROOM UNIT	-
6	-	UHN	01	CHIMNEY	-
7	-	UYC	01	SERVICE BUILDING	-
8	-	UAA	01	765KV GIS SWITCH YARD	-
8A	-	UAA	02	230KV GIS SWITCH YARD	-
9	-	UHQ	01	SPACE FOR FGD PLANT	-
10	-	UGL	01	RO DM PLANT	-
11	-	ULC	01	CONDENSATE STORAGE TANK	-
12	-	UEJ	01	FUEL OIL TANK FARM	
12A	-	UEH	01	FUEL OIL UNLOADING PUMP HOUSE	-
13	-	USC	01	COMPRESSOR HOUSE	-
14	-	UEL	01	FUEL OIL FORWARDING PUMP HOUSE	-
15	-	UHJ	01	MILL REJECT COMPRESSOR ROOM	-
15A	-	UBN	01	EMERGENCY DG ROOM	-
16	-	UCE	01	AHP MCC & CONTROL ROOM	-
16A	-	UEP	01	AHP COMPRESSOR & BLOWERS	-
16B	-	UEW	01	CLARIFIER FOR ASH RECOVERY WATER	-
16C	-	UEW	02	RECOVERY WATER PUMPHOUSE	-
17	-	UEP	01	VACUUM PUMP HOUSE	-
18	-	UCE	01	EXTERNAL COAL HANDLING CONTROL ROOM	-
18A	-	UCE	02	INTERNAL COAL HANDLING CONTROL ROOM	-
19	-	UED	01	BULLDOZER SHED	-
20	-	UEQ	01	ASH WATER PUMP HOUSE	-
21	-	UET	01	ASH SILO	-
22	-	UEQ	02	ASH SLURRY PUMP HOUSE	-
23	-	UPA	01	COOLING WATER PUMP HOUSE (CW)	-
24	-	URA	01	NATURAL DRAFT COOLING TOWERS	-
25	-	UEB	01	CRUSHED COAL STOCK PILE	-
26	-	UEE	01	CRUSHER HOUSE	-
27	-	UYC	01	ADMIN. BUILDING	-
28	-	UYD	01	CANTEEN	-
28A	-	UYD	02	MINI CANTEEN	-
29	-	UYP	01	FIRE STATION	-
30	-	UYG	01	SECURITY & TIME OFFICE	-
31	-	UYE	01	MAIN PLANT GATE	-
32	-	USG	01	FILTERED WATER/FIRE WATER STORAGE TANK AND PH	-
33	-	UXP	01	SEA WATER INTAKE PUMP HOUSE ELECTRO CHLORINATION BUILDING	-
33A	-	UXP	02	SEA WATER INTAKE PUMP HOUSE SWITCH GEAR BUILDING	-
34	-	UST	01	WORKSHOP/ TRAINING CENTRE.	-
35	-	UGN	01	CLARIFIED WATER STORAGE TANK	-
36	-	UZD	01	PARKING AREA FOR SILO TRUCK	-
36A	-	UZD	02	PARKING SHED FOR ADMIN BUILDING	-
37	-	UPA	01	C.W.PUMP HOUSE & FORE BAY	-
38	-	UPQ	01	C.W. CHLORINATION BUILDING	-
39	-	UZD	01	WEIGH BRIDGE (3 NOS.) ASH SILO AREA 120MT/ PERMANENT STORES COMPLEX AREA 60MT AND CENTRAL STORES BUILDING COMPLEXAREA 100MT	-
40	-	UAC	01	SWITCH YARD CONTROL BUILDING	-
41	-	USU	01	WAREHOUSE (PERMANENT STORES COMPLEX)	-
42	-	ULD	01	EFFLUENT TREATMENT PLANT	-
43	-	UYF	01	WATCH TOWER	-
44	-	UDJ	01	EQUIPMENT FABRICATION/ASSEMBLY YARD (3 NOS.)	-
45	-	UZD	03	CAR & BIKE PARKING	-
46	-	UTG	01	HYDROGEN GENERATION PLANT	-
47	-	UTH	01	AUXILIARY BOILER	-
48	-	UYJ	01	DISPENSARY	-
49	-	UTG	01	GAS CYLINDER STORAGE SHED (N2)	-
50	-	UTG	02	GAS CYLINDER STORAGE SHED (H2 & CO2)	-
51	-	-	01	LIGHTING MAST	-
52	-	UEW	01	BOTTOM ASH INTERMEDIATE SURGE HOPPER	-
53	-	UEX	01	ICHS DUST SUPRESSION PUMP HOUSE	-
54	-	UEA	01	CHP MAINTANANCE OFFICE BUILDING	-
55	-	UGV	01	SEWAGE TREATMENT PLANT	-
56	-	UGG	01	DRINKING WATER RCC TANK (50 Cu.M)	-
57	-	ULD	01	CPU REGENERATION BUILDING	-
58	-	USU	02	CENTRAL STORES BUILDING COMPLEX	-
59	-	USK	01	FIRE WATER BOOSTER PUMP HOUSE	-
60	-	UEW	01	BOTTOM ASH SILO	-
61	-	UGD	01	DM WATER STORAGE TANK	-
62	-	UGT	01	GUARD POND	-
63	-	UGK	01	PTP SLUDGE SUMP	-
64	-	UBA	01	PLANT WATER SWITCHGEAR ROOM	-
65	-	UGB	01	PTP CLARIFIER	-
66	-	UEW	-	CHEMICAL HOUSE FOR AWCS	-
67	-	-	-	GREEN BELT	
68	-	-	01	BANK CUM ATM BUILDING	

SPACE FOR STAMP

CUSTOMER REFERENCE DRAWINGS.

DWG. NO.	TITLE
1. LII-GEOE15066-G-00010-001 (REV.1)	PLOT PLAN (TENDER STAGE)

BTG REFERENCE DRAWINGS.

DWG. NO.	TITLE
1. PE-DG-423-100-M002 (REV.4)	MAIN EQUIPMENT PLANT LAYOUT(AT EL 0.0M)

BGR REFERENCE DRAWINGS.

DWG. NO.	TITLE
1. GID-244-ME-U-XF-10002	OVERALL PLOT PLAN

ROAD SCHEDULE

ROAD TYPE	ROAD WIDTH	SHOULDER WIDTH
TYPE I RCC ROAD	7.5M	2.5M
TYPE II RCC ROAD	4.5M	1.5M
TYPE III RCC ROAD	3.0M	1.0M

NOTES:-

1. ALL DIMENSIONS ARE IN MILLI METERS AND CO-ORDINATES ARE IN METERS UNLESS NOTED OTHERWISE.
2. FINISHED FLOOR LEVEL OF TG BUILDING IS EL. 0.00M WHICH CORRESPONDS TO RL 10.00M
   FGL OF PLANT AREA IS EL.(-)0.500M (RL.9.50M).
3. DELETED.

HOLD POINTS:-

1. LIGHTING MAST LOCATIONS.

ZONE	REV	DESCRIPTION	DATE	DRN	CIVIL	MECH.	ELEC.	C&I	HOD
	3	REVISED AS PER TANGEDCO LR. NO.SE/E/THP/EE8/AEE3/F.NCTPP, ST.-III(BOP)/D.217/17 DT 23.06.17 AND OTHER REVISIONS AS MARKED, ISSUED FOR APPROVAL.	24/07/17					-	
	2	REVISED AS PER TANGEDCO LR.NO.SE/E/THP/EE8/AEE2/F.NCTPP,ST-III(BOP) /D.14/17 DT 14.03.17 & REFER CRS FOR SUMMARY OF OTHER REVISIONS,ISSUED FOR APPROVAL.	17/04/17	Sd/-	Sd/-	Sd/-	Sd/-	-	Sd/-
	1	REVISED AS PER TANGEDCO LR.NO. SE/E/THP/E8/AEE2/F.NCTPP,ST-III(BOP) /D.80/17 & REFER CRS FOR SUMMARY OF OTHER REVISIONS.	28/02/17	Sd/-	Sd/-	Sd/-	Sd/-	-	Sd/-
	0	PRELIMINARY ISSUE	16/01/17	Sd/-	Sd/-	Sd/-	Sd/-	-	Sd/-

REVISIONS | APPROVED

ISSUED FOR APPROVAL

DO NOT SCALE THE DRAWING

POWER PROJECTS DIVISION-CH

OWNER

TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION LIMITED

PROJECT

1 X 800MW - NCTPP - STAGE - III

ENNORE & PUZHUDHIVAKKAM VILLAGE, CHENNAI, TAMILNADU

OWNER'S CONSULTANT

FICHTNER CONSULTING ENGINEERS (INDIA) PRIVATE LIMITED
CHENNAI - INDIA

BOP EPC CONTRACTOR

BGR ENERGY SYSTEMS LIMITED
CHENNAI - INDIA

	NAME	SIGN	DATE
DRN.	S VEERA	Sd/-	17/12/2016
DGN.	M KARTHIKEYAN	Sd/-	17/12/2016
CHD.	R RAVI ALWAR	Sd/-	17/12/2016
APPD.	A N MADHAVAN	Sd/-	17/12/2016

SHEET SIZE: A0

DEPT. / CODE.: UNTOL. DIMS. GR. C/M/F

SCALE: 1:1800

BOP EPC CONTRACTOR'S DRAWING NO.: GID-244-ME-U-XF-10001 | REV.: 3

OWNER'S DRAWING NO.: --

TITLE: PLOT PLAN FOR STAGE III

SHEET No. 1 OF 1

FILE NAME:- GID-244-ME-U-XF-10001_REV_3

LIST OF APPROVED VENDORS FOR SUB ITEMS OF CCTV AND ACCESS CONTROL SYSTEM
Power cable
M/S CCIL, BANGALORE
M/S CORDS CABLE, BHIWADI
M/S DELTON CABLES, FARIDABAD
M/S FORD GLASTER INDUSTRIES, KOLKATA
M/S GOYOLENE FIBERS, MUMBAI
M/S INCAB, PUNE
M/S INDUSTRIAL CABLE, RAJPURA
M/S KEI INDUSTRIES, CHENNAI(X404186)
M/S NICCO CORPORATION LTD., KOLKATA
M/S PARAMOUNT COMMUNICATIONS LTD., ALWAR
M/S POLYCAB WIRES, DAMAN
M/S RADIANT CABLES, HYDERABAD
M/S RELIANCE ENGINEERS, BANGALORE
M/S TORRENT, NADIAD
M/S UNIVERSAL CABLES LTD
MINI UPS
APLAB (THANE), HITACHI HI-REL (BANGALORE), SCHNEIDER ELECTRIC (BANGALORE), VERTIV (PUNE), DELTA
FO cable:
Birla Erricson (Rewa), Aksh Fibre(Bhiwadi), HFCL (Goa), Finolex (pune), R&M, TYCO/AMP
PRINTER
HP, IBM, CANON, XEROX, EPSON (INKJET ONLY), LEXMARK
MONITOR
HP, IBM, DELL, SAMSUNG, NEC
LED TV
SONY, LG, SAMSUNG, NEC
9U, 12U and 42U PANEL
Chemin, IL, Kota, Pyrotech ,Udaipur, Khoday Control Systems,Bangalore

For all other items whose make are not mentioned in technical specification and above, the offered make shall be reputed and supplied & commissioned earlier in power/process industry.

ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
भारत हेवी इलेक्ट्रिकल्स लिमिटेड
Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division
PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE: PR: 002- Rev 00

GENERAL COMMERCIAL CONDITIONS FOR CONTRACT

These 'General Commercial Conditions for Contract for Purchase' hereinafter referred to as GCC apply to all enquiries, tenders, requests for quotations, orders, contracts and agreements concerning the supply of goods and the rendering of related services (hereinafter referred to as "deliveries") to Bharat Heavy Electricals Limited and any of its units, regions or divisions (hereinafter referred to as "BHEL" or the Purchaser) or its projects / customers.

Any deviations from or additions to these GCC require BHEL's express written consent. The general terms of business or sale of the vendor shall not apply to BHEL. Acceptance, receipt of shipments or services or effecting payment shall not mean that the general terms of business or sale of the vendor have been accepted.

Orders, agreements and amendments thereto shall be binding if made or confirmed by BHEL in writing. Only the Purchasing department of BHEL is authorized to issue the Purchase Order or any amendment thereof.

Definitions: Throughout these conditions and in the specifications, the following terms shall have the meanings assigned to them, unless the subject matter or the context requires otherwise.

a) 'The Purchaser' means Bharat Heavy Electricals Limited, Electronics division, Mysore road, Bangalore 560 026, a Unit of Bharat Heavy Electricals Limited (A Govt. of India Undertaking) incorporated under the Companies Act having its registered office at BHEL House, Siri Fort, New Delhi-110049, India and shall be deemed to include its successors and assigns. It may also be referred to as BHEL.
b) 'The vendor' means the person, firm, company or organization on whom the Purchase Order is placed and shall be deemed to include the vendor's successors, representative heirs, executors and administrator as the case may be. It may also be referred to as Seller, Contractor or Supplier.
c) 'Contract' shall mean and include the Purchase Order incorporating various agreements, viz. tender/ RFQ, offer, letter of intent / acceptance / award, the General Conditions of Contract and Special Conditions of Contract for Purchase, Specifications, Inspection / Quality Plan, Schedule of Prices and Quantities, Drawings, if any enclosed or to be provided by BHEL or his authorized nominee and the samples or patterns if any to be provided under the provisions of the contract.
d) 'Parties to the Contract' shall mean the 'The Vendor' and the Purchaser as named in the main body of the Purchase Order.

Interpretation:

In the contract, except where the context requires otherwise:

a) words indicating one gender include all genders;
b) words indicating the singular also include the plural and words indicating the plural also include the singular;
c) provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing, and
d) "Written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

(SVRao)

Applicable Conditions:

1. Price Basis: All prices shall be firm until the purchase order is executed / completed in all respects. No price variations / escalation shall be permitted unless otherwise such variations / escalations are provided for and agreed by BHEL in writing in the purchase order.

2. Validity: The offer will be valid for a period of 120 days from the date of technical bid opening date. Validity beyond 120 days, if required, will be specified in the SCC (special conditions of contract).

3. Ordering and confirmation of Order: Vendor shall send the order acceptance on their company letter head within two weeks from the date of Purchase Order or such other period as specified / agreed by BHEL. BHEL reserves the right to revoke the order placed if the order confirmation differs from the original order placed. The acceptance of goods/services/supplies by BHEL as well as payments made in this regard shall not imply acceptance of any deviations.
   The purchase order will be deemed to have been accepted if no communication to the contrary is received within two weeks (or the time limit as specified / agreed by BHEL) from the date of the purchase order.

4. Documentation: After receipt of Purchase Order, vendor should submit required documents like drawings, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report , O & M Manuals and/or any other relevant documents as per Specification/Purchase Order, as and when required by BHEL/Customer.
   At any stage within the contract period, the vendor shall notify of any error, fault or other defect found in BHEL's documents /specifications or any other items for reference. If and to the extent that (taking account of cost and time) any vendor exercising due care would have discovered the error, fault or other defect when examining the documents/specifications before submitting the tender, the time for completion shall not be extended. However if errors, omissions, ambiguities, inconsistencies, inadequacies or other defects are found in the vendor's documents, they shall be corrected at his cost, notwithstanding any consent or approval.

5. Penalty:
   For delay in documentation: In the event of delay in submission of complete set of documents ((like drawings, bill of materials, datasheets, catalogues, quality plan etc. as called in tender specifications including soft copies wherever applicable) in required sets beyond three weeks (or as agreed/indicated in the Purchase Order) from the date of Purchase Order, penalty at 0.5% (half percent) per week or part thereof, limited to a maximum of 5% (five percent) of the basic material value of the Purchase Order will be applicable.

   For delay in delivery: In the event of delay in agreed contractual delivery as per Purchase Order, penalty @ 0.5 % (half percent) per week or part thereof but limited to a max of 10% (ten percent) value of undelivered portion (basic material cost) will be applicable. Delivery will commence from the date of document approval by customer / BHEL or date of issue of manufacturing clearance, whichever is later. The date for which Inspection call is issued by vendor along with test certificates / test reports / Certificate of Conformance / calibration reports, as proof of completion of manufacturing will be treated as date of deemed delivery for penalty calculation. In the absence of furnishing such document indicated above as proof of completion of manufacturing along with inspection call, actual date of inspection will be considered as date of deemed delivery and BHEL will not be responsible for delay in actual date of inspection.

   Penalty for delayed documentation/delayed delivery, if applicable, shall be deducted at the time of first payment. If penalty is applicable for duration of less than a week, penalty @ 0.5% (half percent) of the basic material value will be deducted.

6. Contract variations (Increase or decrease in the scope of supply): BHEL may vary the contracted scope as per requirements at site. If vendor is of the opinion that the variation has an effect on the agreed price or delivery period, BHEL shall be informed of this immediately in writing along with technical details. Where unit rates are available in the Contract, the same shall be applied to such additional work. Vendor shall not

(SVRao)

perform additional work before BHEL has issued written instructions / amendment to the Purchase Order to that effect. The work which the vendor should have or could have anticipated in terms of delivering the service(s) and functionality (i.e.) as described in this agreement, or which is considered to be the result of an attributable error on the vendor's part, shall not be considered additional work.

7. Reverse Auction: BHEL reserves the right to follow REVERSE AUCTION PROCEDURE (ONLINE BIDDING ON NETWORK) before finalising the Purchase order on technically competent bidders, as per the guidelines given in Annexure III. In case BHEL does not resort to Reverse Auction, the price bids and price impacts (if any) already submitted and available with BHEL shall be opened as per BHEL's standard practice.

8. Inspection: Prior written notice of at least 10 days shall be given along with internal test certificates / COC and applicable test certificates. Materials will be inspected by BHEL-EDN-QS/CQS or BHEL nominated Third Party Inspection Agency (TPIA) or BHEL authorized Inspection Agency or Customer / Consultant or jointly by BHEL & Customer / consultant. All tests have to be conducted as applicable in line with approved Quality plan or QA Checklist or Purchase specification and original reports shall be furnished to BHEL-EDN, Bangalore for verification / acceptance for issue of dispatch clearance.
   All costs related to inspections & re-inspections shall be borne by vendor. Whether the Contract provides for tests on the premises of the vendor or any of his Sub-contractor/s, vendor shall be responsible to provide such assistance, labour, materials, electricity, fuels, stores, apparatus, instruments as may be required and as may be reasonably demanded to carry out such tests efficiently. Cost of any type test or such other special tests shall be borne by BHEL only if specifically agreed to in the purchase order.

9. Transit Insurance: Transit insurance coverage between vendor's works and project site shall be to the account of BHEL, unless specifically agreed otherwise. However, vendor shall send intimation directly to insurance agency (as mentioned in dispatch instructions issued by BHEL) through fax/courier/e-mail, immediately on dispatch of goods for covering insurance. A copy of such intimation sent by vendor to insurance agency shall be given to BHEL along with dispatch documents. Dispatch documents will be treated as incomplete without such intimation copy. BHEL shall not be responsible for sending intimations to insurance agency on behalf of the vendor.

10. High Sea Sales (HSS): Customs clearance of the consignment landed on Indian Sea / Air ports will be done by BHEL based on the original HSS documents provided by vendors.
    Any delay in submission of complete / correct HSS documents to BHEL may incur demurrage charges. All demurrage charges on account of incomplete / incorrect HSS documents submission by vendor will be to vendor's account and all such charges will be recovered from any of the available vendor bills with BHEL.

11. Packaging and dispatch: The Seller shall package the goods safely and carefully and pack them suitably in all respects considering the peculiarity of the material for normal safe transport by Sea / Air / Rail / Road to its destination suitably protected against loss, damage, corrosion in transit and the effect of tropical salt laden atmosphere. The packages shall be provided with fixtures / hooks and sling marks as may be required for easy and safe handling. If any consignment needs special handling instruction, the same shall be clearly marked with standard symbols / instructions. Hazardous material should be notified as such and their packing, transportation and other protection must conform to relevant regulations.
    The packing, shipping, storage and processing of the goods must comply with the prevailing legislation and regulations concerning safety, the environment and working conditions. Any Imported/Physical Exports items packed with raw / solid wood packing material should be treated as per ISPM – 15 (fumigation) and accompanied by Phytosanitory / Fumigation certificate. If safety information sheets (MSDS – Material Safety Data Sheet) exist for an item or the packaging, vendor must provide this information without fail along with the consignment.
    Each package must be marked with Consignee name, Purchase order number, Package number, Gross weight and net weight, dimensions (L x B x H) and Seller's name. Packing list of goods inside each package with PO item number and quantity must also be fixed securely outside the box to indicate the contents of each box. Total number of packages in the consignment must also be indicated.
    Separate packing & identification of items should be as follows.
    1. Main Scope - All items must be tagged with part no. & item description.
    2. Commissioning spares - All items must be tagged with part no. & item description.
    3. Mandatory spares - All items must be tagged with part no. & item description.

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12. Assignment of Rights & Obligations; Subcontracting: Vendor is not permitted to subcontract the delivery or any part thereof to third party or to assign the rights and obligations resulting from this agreement in whole or in part to third parties without prior written permission from BHEL. Any permission or approval given by the BHEL shall, however, not absolve the vendor of the responsibility of his obligations under the Contract.

13. Progress report: Vendor shall render such report as to the progress of work and in such form as may be called for by the concerned purchase officer from time to time. The submission and acceptance of such reports shall not prejudice the rights of BHEL in any manner.

14. Non-disclosure and Information Obligations: Vendor shall provide with all necessary information pertaining to the goods as it could be of importance to BHEL. Vendor shall not reveal confidential information that may be divulged by BHEL to Vendor's employees not involved with the tender/ contract & its execution and delivery or to third parties, unless BHEL has agreed to this in writing beforehand. Vendor shall not be entitled to use the BHEL name in advertisements and other commercial publications without prior written permission from BHEL.

15. Cancellation / Termination of contract: BHEL shall have the right to completely or partially terminate the agreement by means of written notice to that effect. Termination of the Contract, for whatever reason, shall be without prejudice to the rights of the parties accrued under the Contract up to the time of termination.
    BHEL shall have the right to cancel/foreclose the Order/ Contract, wholly or in part, in case it is constrained to do so, on account of any decline, diminution, curtailment or stoppage of the business.

16. Risk Purchase Clause: In case of failure of supplier, BHEL at its discretion may make purchase of the materials / services NOT supplied / rendered in time at the RISK & COST of the supplier. Under such situation, the supplier who fails to supply the goods in time shall be wholly liable to make good to BHEL any loss due to risk purchase.
    In case of items demanding services at site like erection and commissioning, vendor should send his servicemen /representatives within 7 days from the service call. In case a vendor fails to attend to the service call, BHEL at its discretion may also make arrangements to attend such service by other parties at the **RISK & COST** of the supplier. Under such situation the supplier who fails to attend the service shall be wholly liable to make good to BHEL any loss due to risk purchase / service including additional handling charges due to the change.

17. Shortages: In the event of shortage on receipt of goods and/or on opening of packages at site, all such shortages shall be made good within a reasonable time that BHEL may allow from such intimation and free of cost. In case BHEL raises an insurance claim, the cost of material limited to insurance settled amount less handling charges will have to be reimbursed by the Supplier.
    Transit Damages: In the event of receipt of goods in damaged condition or having found them so upon opening of packages at site, Supplier shall make good of all such damages within a reasonable time from such intimation by BHEL. In case BHEL raises an insurance claim, the cost of material limited to insurance settled amount less handling charges will be reimbursed.

18. Remedial work: Notwithstanding any previous test or certification, BHEL may instruct the vendor to remove and replace materials/goods or remove and re-execute works/services which are not in accordance with the purchase order. Similarly BHEL may ask the vendor to supply materials or to execute any services which are urgently required for any safety reasons, whether arising out of or because of an accident, unforeseeable event or otherwise. In such an event, Vendor shall provide such services within a reasonable time as specified by BHEL.

19. Indemnity Clause: Vendor shall comply with all applicable safety regulations and take care for the safety of all persons involved. Vendor is fully responsible for the safety of its personnel or that of his subcontractor's men / property, during execution of the Purchase Order and related services. All statutory payments including PF, ESI or other related charges have to be borne by the vendor. Vendor is fully responsible for ensuring that all legal compliances are followed in course of such employment.

20. Product Information, Drawings and Documents: Drawings, technical documents or other technical information received by Vendor from BHEL or vice versa shall not, without the consent of the other party, be used for any other purpose than that for which they were provided. They may not, without the consent of the Disclosing party, otherwise be used or copied, reproduced, transmitted or communicated to third parties. All information and data contained in general product documentation, whether in electronic or any other form, are binding only to the extent that they are by reference expressly included in the contract.
    Vendor, as per agreed date/s but not later than the date of delivery, provide free of charge information and drawings which are necessary to permit and enable BHEL to erect, commission, operate and maintain the product. Such information and drawings shall be supplied in as many numbers of copies as may be agreed upon.
    All intellectual properties, including designs, drawings and product information etc. exchanged during the formation and execution of the Contract shall continue to be the property of the disclosing party.

21. Intellectual Property Rights, Licenses: If any Patent, design, Trade mark or any other intellectual property rights apply to the delivery (goods / related service) or accompanying documentation shall be the exclusive property of the Vendor and BHEL shall be entitled to the legal use thereof free of charge by means of a non-exclusive, worldwide, perpetual license. All intellectual property rights that arise during the execution of the Purchase Order/ contract for delivery by vendor and/or by its employees or third parties involved by the vendor for performance of the agreement shall belong to BHEL. Vendor shall perform everything necessary to obtain or establish the above mentioned rights. The Vendor guarantees that the delivery does not infringe on any of the intellectual property rights of third parties. The Vendor shall do everything necessary to obtain or establish the alternate acceptable arrangement pending resolution of any (alleged) claims by third parties. The Vendor shall indemnify BHEL against any (alleged) claims by third parties in this regard and shall reimburse BHEL for any damages suffered as a result thereof.

22. Force Majeure: Notwithstanding anything contained in the purchase order or any other document relevant thereto, neither party shall be liable for any failure or delay in performance to the extent said failures or delays are caused by the "Act of God" and occurring without its fault or negligence, provided that, force majeure will apply only if the failure to perform could not be avoided by the exercise of due care and vendor doing everything reasonably possible to resume its performance.
    A party affected by an event of force majeure which may include fire, tempest, floods, earthquake, riot, war, damage by aircraft etc., shall give the other party written notice, with full details as soon as possible and in any event not later than seven (7) calendar days of the occurrence of the cause relied upon. If force majeure applies, dates by which performance obligations are scheduled to be met will be extended for a period of time equal to the time lost due to any delay so caused.

    Notwithstanding above provisions, in an event of Force Majeure, BHEL reserves for itself the right to cancel the order/ contract, wholly or partly, in order to meet the overall project schedule and make alternative arrangements for completion of deliveries and other schedules.

23. Guarantee / Warranty: Wherever required, and so provided in the specifications / Purchaser Order, the Seller shall guarantee that the stores supplied shall comply with the specifications laid down, for materials, workmanship and performance. Unless otherwise specified, guarantee / warranty period shall be 30 months after the date of delivery of goods or 24 months from the date of commissioning of goods whichever is earlier. The guarantee / warranty period as described above shall apply afresh to replaced, repaired or re-executed parts of a delivery. Unless otherwise specifically provided in the Purchase Order, Vendor's liability shall be co terminus with the expiration of the applicable guarantee / warranty period.

24. Limitation of Liability: Vendor's liability towards this contract is limited to a maximum of 100% of the contract value and consequential damages are excluded. However the limits of liability will have no effect in cases of criminal negligence or wilful misconduct.
    The total liability of Vendor for all claims arising out of or relating to the performance or breach of the Contract or use of any Products or Services or any order shall not exceed the total Contract price.

(S V Rao)

25. Liability during guarantee / warranty: Vendor shall arrange replacement / repair of all the defective materials / services under its obligation under the guarantee / warranty period. The rejected goods shall be taken away by vendor and replaced / repaired. In the event of the vendor's failure to comply, BHEL may take appropriate action including disposal of rejections and replenishment by any other sources at the cost and risk of the vendor.
    In case, defects attributable to vendor are detected during first time commissioning or use, vendor shall be responsible for replacement / repair of the goods as required by BHEL at vendor's cost. In all such cases expiry of guarantee / warranty will not be applicable.

26. Liability after guarantee / warranty period: At the end of the guarantee / warranty, the Vendor's liability ceases except for latent defects (latent defects are defects / performance issues notices after the guarantee / warranty has expired). The Contractor's liability for latent defects warranty for the plant and equipment including spares shall be limited to a period of six months from the end of the guarantee / warranty period of the respective plant and equipment including spares or first time commissioning whichever is later but not later than 3 (three) years from the date of shipment.

27. Compliance with Laws: Vendor shall, in performing the contract, comply with all applicable laws. The vendor shall make all remittances, give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the laws in relation to the execution and completion of the contract and for remedying of any defects; and the Contractor shall indemnify and hold BHEL harmless against and from the consequences of any failure to do so.

28. Settlement of Disputes: Except as otherwise specifically provided in the Purchase Order, decision of BHEL shall be binding on the vendor with respect to all questions relating to the interpretation or meaning of the terms and conditions and instructions herein before mentioned and as to the completion of supplies/work/services, other questions, claim, right, matter or things whatsoever in any way arising out of or relating to the contract, instructions, orders or these conditions or otherwise concerning the supply or the execution or failure to execute the order, whether arising during the schedule of supply/work or after the completion or abandonment thereof. Any disputes or differences among the parties shall to the extent possible be settled amicably between the parties thereto, failing which the disputed issues shall be settled through arbitration. Vendor shall continue to perform the contract, pending settlement of dispute(s).

29. Arbitration Clause: In case amicable settlement is not reached in the event of any dispute or difference arising out of the execution of the Contract or the respective rights and liabilities of the parties or in relation to interpretation of any provision in any manner touching upon the Contract, such dispute or difference shall (except as to any matters, the decision of which is specifically provided for therein) be referred by either party to the sole arbitration of an Arbitrator appointed by the Executive Director/ General Manager of the purchasing unit/ region/ division of BHEL. Vendor shall have no objection even if the Arbitrator so appointed is an employee of BHEL or has ever dealt/ had to deal with any matter relating to this Contract.
    Subject as aforesaid the provisions of the Arbitration and Conciliation Act, 1996 of India or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceedings under this clause. It is a term of contract that the party initiating arbitration shall specify the dispute or disputes to be referred to arbitration under this clause together with the amount or amounts claimed in respect of each such dispute. The venue for the arbitration shall be Bangalore, India. The award of the arbitrator shall be a speaking award and shall be final, conclusive and binding on all parties to this contract.
    The cost of arbitration shall be borne equally by the parties. Notwithstanding the existence of any dispute or difference or any reference for the arbitration, the vendor shall proceed with and continue without hindrance the performance of the work under the contract with due diligence and expedition in a professional manner.

30. Applicable Laws and Jurisdiction of Courts: Prevailing Indian laws both substantive and procedural, including modifications thereto, shall govern the Contract. Subject to the conditions as aforesaid, the competent courts in BANGALORE alone shall have jurisdiction to consider over any matters touching upon this contract.

(SVRao)

31. General Terms: That any non-exercise, forbearance or omission of any of the powers conferred on BHEL and /or any of its authorities will not in any manner constitute waiver of the conditions hereto contained in these presents.
That the headings used in this agreement are for convenience of reference only.
That all notices etc., to be given under the Purchase order shall be in writing, type script or printed and if sent by registered post or by courier service to the address given in this document shall be deemed to have been served on the date when in the ordinary course, they would have been delivered to the addressee.

(S V Rao)

32. Fraud Prevention Policy: The bidder along with its associate/collaborators/sub-contractors/ sub-vendors/consultants/service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
भारत हेवी इलेक्ट्रिकल्स लिमिटेड
Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division
PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE: PR: 001- Rev 00

INSTRUCTIONS TO BIDDERS (Common for all RFQs)

Bidder is requested to read the instructions carefully and submit their quotation covering all the points:

A. GENERAL INSTRUCTIONS:

1. Any Purchase Order resulting from this enquiry shall be governed by the Instructions to Bidders (document reference: CE: PR: 001 – Rev 00), General Conditions of Contract (document reference: CE: PR: 002 - Rev 00) and Special Conditions of Contract, if any, of the enquiry.
2. Any deviations from or additions to the "General Conditions of Contract" or "Special Conditions of Contract" require BHEL's express written consent. The general terms of business or sale of the bidder shall not apply to this tender.
3. Bidders (also includes the term suppliers / contractors wherever used in this document) are instructed to quote their most competitive price and best delivery, etc. in the offer. Prices should be indicated in both figures & words. **(Please also refer clause 11 under section B)**
4. Regret letter (either through post or by mail) indicating reasons for not quoting must be submitted without fail, in case of non-participation in this tender. If a bidder fails to respond against 3 consecutive tenders for the same item, he will be liable for removal as a registered vendor of BHEL.
5. Procurement directly from the manufacturers shall be preferred. However, if the OEM / Principal insist on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer / supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer / supplier or the manufacturer / supplier could bid directly but not both. In case bids are received from the manufacturer / supplier and his agent, bid received from the agent shall be ignored.
6. Consultant / firm (and any of its affiliates) shall not be eligible to participate in the tender/s for the related goods for the same project if they were engaged for consultancy services for the same project.
7. If an Indian representative / associate / liaison office quotes on behalf of a foreign based bidder, such representative shall furnish compulsorily the following documents:
   a. Authorization letter to quote and negotiate on behalf of such foreign-based bidder.
   b. Undertaking from such foreign based bidder that such contract will be honored and executed according to agreed scope of supply and commercial terms and conditions.
   c. Undertaking shall be furnished by the Indian representative stating that the co-ordination and smooth execution of the contract and settlement of shortages / damages / replacement / repair of imported scope till system is commissioned and handed over to customer will be the sole responsibility of the Indian representative / associates / agent / liaison office.
   d. Refer **Annexure X** on "Guidelines for Indian Agents".
8. In case of imported scope of supply, customs clearance & customs duty payment will be to BHEL account after the consignment is received at Indian Airport / Seaport. Bidders must provide all original documents required for completing the customs clearance along with the shipment. Warehousing charges due to

incomplete or missing documentation will be recovered from the supplier's bill. All offers for imported scope of supply must be made from any of the gateway ports (within the country) indicated. **(Refer Annexure I)**

9. The offers of the bidders who are on the banned list and also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of the banned firms is available on BHEL website: **www.bhel.com**
10. Business dealings with bidders will be suspended if they are found to have indulged in any malpractices / misconduct which are contrary to business ethics like bribery, corruption, fraud, pilferage, cartel formation, submission of fake/false/forged documents, certificates, information to BHEL or if they tamper with tendering procedure affecting the ordering process or fail to execute a contract, or rejection of 3 consecutive supplies or if their firms / works are under strike / lockout for a long period.

B. <u>GUIDELINES FOR PREPARATION OF OFFER:</u>

1. Quotation shall be submitted in Single Part Bid, Two Part Bid or Three Part Bid, as called for in the tender:
   - **SINGLE PART BID**: Technical and Commercial Bid with prices along with price summary & filled in BHEL Standard Commercial terms and conditions in a single sealed envelope.
   - **TWO PART BID**: Unpriced offer i.e. "Techno-commercial Bid" with filled in BHEL Standard Commercial terms and conditions in a sealed envelope **along with the copy of the "Price Bid" without the prices** should be enclosed in one cover and the cover must be super scribed **"Techno-commercial offer)** and Priced offer i.e. "Price Bid" containing price summary in a separate sealed envelope and must be super scribed **"Price Bid"**. Both these envelopes shall be enclosed in a single sealed envelope super scribed with enquiry number due date of tender and any other details as called for in the tender document.
   - **THREE PART BID**: Pre-qualification Bid (Part-I), Techno Commercial Bid with filled in BHEL Standard Commercial terms and conditions (Part-II), and Price Bid (Part-III). All three envelopes shall be enclosed in a single sealed envelope super scribed with enquiry number due date of tender and any other details as called for in the tender document.

   If any of the offers (Part I, Part II or Part III) are not submitted before the due date and time of submission or if any part of the offer is incomplete the entire offer of the bidder is liable for rejection.
2. Supplier shall ensure to super scribe each envelope with RFQ number, RFQ Date, RFQ Due date and time, Item Description and Project clearly & boldly. Also mention on the envelope whether it is "Techno Commercial Bid" or "Price Bid" or "Pre-Qualification Bid". Pease ensure complete address, department name and purchase executive name is mentioned on the envelope (before dropping in the tender box or handing over) so that the tender is available in time for bid opening.
3. BHEL standard Commercial Terms and Conditions (duly filled, signed & stamped) must accompany Technical-Commercial offer without fail and should be submitted in original only. Xerox copy will not be accepted.
4. Any of the terms and conditions not acceptable to supplier, shall be explicitly mentioned in the Techno-Commercial Bid. If no deviations are brought out in the offer it will be treated as if all terms and conditions of this enquiry are accepted by the supplier without deviation.
5. Deviation to this specification / item description, if any, shall be brought out clearly indicating "DEVIATION TO BHEL SPECIFICATION" without fail, as a part of Techno-Commercial Bid. If no deviations are brought out in the offer it will be treated as if the entire specification of this enquiry is accepted without deviation.
6. Suppliers shall submit one set of original catalogue, datasheets, bill of materials, dimensional drawings, mounting details and / or any other relevant documents called in purchase specification as part of Technical Bid.
7. "Price Bid" shall be complete in all respects containing price break-up of all components along with all

applicable taxes and duties, packing & forwarding charges (if applicable), freight charges (if applicable) etc. Once submitted no modification / addition / deletion will be allowed in the "Price Bid." Bidders are advised to thoroughly check the unit price, total price to avoid any discrepancy.

8. In addition, bidder shall also quote for erection & commissioning charges (E&C charges), documentation charges, service charges, testing Charges (type & routine), training charges, service tax, etc. wherever applicable. The price summary must indicate all the elements clearly.
9. Vendors should indicate "lump sum" charges (including To & Fro Fare, Boarding, Lodging, Local Conveyance etc.) for Supervision of Erection, Commissioning and handing over to customer. The quotation shall clearly indicate scope of work, likely duration of commissioning, pre-commissioning checklist and service tax (if any).
10. Wherever bidders require PAC (Project Authority Certificate) for import of raw materials, components required for Mega Power Projects, Export Projects or other similar projects wherein supplies are eligible for customs duty benefits, lists and quantities of such items and their values (CIF) has to be mentioned in the offer. Prices must be quoted taking into account of such benefits.
11. All quotations shall be free from corrections /overwriting. Corrections if any should be authenticated with signature and seal. Any typographical error, totaling mistakes, currency mistake, multiplication mistake, summing mistakes etc. observed in the price bids will be evaluated as per **Annexure II** "Guidelines for dealing with Discrepancy in Words & Figures – quoted in price bid". BHEL decision will be final.

C. <u>GUIDELINES FOR OFFER SUBMISSION:</u>

1. Offers / Quotations must be dropped in tender box before 13.00 Hrs. on or before due date mentioned in RFQ. The offers are to be dropped in the proper slot of the Tender Box kept in our reception area with caption "CE, SC&PV, DEFENCE." Tenders are opened on 3 days in a week (Monday/Wednesday/Friday). Tender must be deposited in the slot corresponding to the day (Monday - Box no.4/Wednesday - Box no. 6 /Friday - Box no.8) while depositing the offer. **(This clause will not be applicable for e-tenders)**
2. E-Mail / Internet / EDI offers received in time shall be considered only when such offers are complete in all respects. In case of offers received through E-mail, please send the offer to the email ID specified in the SCC of the tender. (Refer to SCC document of tender)
3. In cases where tender documents are bulky, or due to some reasons tender documents are required to be submitted by hand or through posts/couriers, the offers are to be handed over either of the two officers whose names are mentioned in the RFQ. (Refer to SCC document of tender)
4. Tenders will be opened on due date, time and venue as indicated in the RFQ in the presence of bidders at the venue indicated in the RFQ. In case of e-procurement, bidders can see tender results till seven days after due date and time.
5. Vendor will be solely responsible:
   a. For submission of offers before due date and time. Offers submitted after due date and time will be treated as "Late offers" and will be rejected.
   b. For submission of offers in the correct compartment of the tender box based on the day of due date (Monday/Wednesday/Friday). Please check before dropping your offer in the correct tender box.
   c. For depositing offers in proper sealed condition in the tender box. If the bidder drops the tender in the wrong tender box or if the tender document is handed over to the wrong person BHEL will not be responsible for any such delays.
   d. For offers received through email etc., suppliers are fully responsible for lack of secrecy on information and ensuring timely receipt of such offers in the tender box before due date & time.
   e. In case of e-tender, all required documents should be uploaded before due date and time. Availability of power, internet connections, etc. will be the sole responsibility of the vendor. Wherever assistance is

needed for submission of e-tenders, help line numbers and executives of service provider of BHEL may be contacted.
Service provider: M-junction
Website address: https://bheleps.buyjunction.in/
Helpline no.: 033-66106426/6217/6013/6046/6176 (9:30 am to 5:30 pm)
9163348283/9163348284/9163348285/9163348286/8584008116 (5:30 pm to 8:30 pm)

Purchase Executive / BHEL will not be responsible for any of the activities relating to submission of offer.

D. PROCESSING OFFERS RECEIVED:

1. Any discount / revised offer submitted by the supplier on its own shall be accepted provided it is received on or before the due date and time of offer submission (i.e. Part-I bid). The discount shall be applied on pro-rata basis to all items unless specified otherwise by the bidder.
2. Changes in offers or Revised offers given after Part-I bid opening shall not be considered as a part of the original offer unless such changes / revisions are requested by BHEL.
3. In case there is no change in the technical scope and / or specifications and / or commercial terms & conditions, the supplier will not be allowed to change any of their bids after Technical bids are opened (after the due date and time of tender opening).
4. In case of changes in scope and/ or technical specifications and/ or commercial terms & conditions by BHEL and it accounts for price implications from vendors, all techno-commercially acceptable bidders shall be asked by BHEL (after freezing the scope, technical specifications and commercial terms & conditions) to submit the impact of such changes on their price bid. Impact price will be applicable only for changes in technical specification / commercial conditions by BHEL. The impact price must be submitted on or before the cut-off date specified by BHEL and the original price bid and the price impact bid will be opened together at the time of price bid opening.
5. BHEL EDN reserves the right to adopt Reverse Auction or standard Price Bid Opening procedure for price evaluation, at its discretion. This will be decided after completion of technical evaluation of tender. **(Refer Annexure III for Guidelines for Reverse Auction)**.
6. Un-opened bids (including price bids) will be returned to the respective bidders after release of PO and receipt of order acknowledgement from the successful bidder.
7. After receipt of Purchase Order, supplier should submit required documents like drawings, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report , O & M Manuals and / or any other relevant documents as per Specification / Purchase Order, as and when required by BHEL / Customer.
8. Any deviation to the terms and conditions not mentioned in the quotation by supplier in response to this enquiry will not be considered, if put forth subsequently or after issue of Purchase Order, unless clarification is sought for by BHEL EDN and agreed upon in the Purchase Order.
9. Evaluation shall be on the basis of delivered cost (i.e. “Total Cost to BHEL").
“Total Cost to BHEL” shall include total basic cost, packing & forwarding charges, taxes and duties, freight charges, insurance, service tax for services, any other cost indicated by vendor for execution of the contract and loading factors (for non-compliance to BHEL Standard Commercial Terms & Conditions). Benefits arising out of Nil Import Duty on Mega Projects, Physical Imports or such 100% exemptions (statutory benefits), customer reimbursements of statutory duties (like Excise Duty, CST, VAT) will also be taken into account at the time of tender evaluation. (wherever applicable and as indicated in SCC document of tender)

10. For evaluation of offers in foreign currency, the exchange rate (TT selling rate of SBI) shall be taken as under:

    Single part bids: Date of tender opening
    Two/three part bids: Date of Part-I bid opening
    Reverse Auction: Date of Part-I bid opening

    In case of Performance Bank Guarantee (PBG) also, exchange rate will be considered as mentioned above for converting foreign currency to Indian currency and vice versa.

    If the relevant day happens to be a bank holiday, then the exchange rate as on the previous working day of the bank (SBI) shall be taken.

11. Ranking (L-1, L-2 etc.) shall be done only for the techno-commercially acceptable offers.

E. INFORMATION ON PAYMENT TERMS:

1. All payments will be through Electronic Fund transfer (EFT). Vendor has to furnish necessary details as per BHEL standard format **(Refer Annexure IV)** for receiving all payments through NEFT. (Applicable for Indian vendors only)
2. In case of High Sea Sales transaction, customs clearance of the consignment landed on Indian Sea / Air ports will be done by BHEL based on the original HSS documents provided by vendors. All warehousing charges due to delay in submission of complete and or correct HSS documents to BHEL will be to suppliers account only. Such recovery will be made out of any of the available bills. **(Refer Annexure V)**.
3. Statutory deductions, if any, will be made and the deduction certificate shall be issued. In case vendor does not provide PAN details, the TDS deduction shall be at the maximum percentage stipulated as per the provisions of Income Tax Act. (Applicable for Indian vendors only).
   Foreign vendors shall submit relevant details of their bankers like Swift Code, Banker's Name & Address etc.
4. Vendors must submit bills & invoices along with required supporting documents in time. Incomplete documentation / delayed submission of invoice / documents will result in corresponding delay in payment.

F. STANDARD PAYMENT TERMS OF BHEL-EDN

Purchase Orders for indigenous procurement

Refer Annexure-XII for Highsea sales payment

(a) SUPPLY WITH E&C:

1) 85% of basic value (excluding E&C charges) + 100% of taxes, duties and freight charges will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation whichever is later.
2) 15% of basic value (retention money), (excluding E&C charges) will be paid in 15 days from the date of submission of documents against supplementary invoice with proof of completion of E&C along with E & C charges (if any)

(b) SUPPLY WITH SUPERVISION OF E&C:

1) 90% basic value (excluding E&C charges) + 100% of taxes, duties and freight charges will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation whichever is later.
2) 10% of basic value (retention money), (excluding E&C charges) will be paid in 15 days from the date of completion of erection and commissioning against supplementary invoice with proof of completion of E&C along with supervision charges (if any)

(c) SUPPLY ONLY:

1) 100% of PO value with taxes, duties and freight will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation whichever is later.

Purchase orders for import procurement:

(d) SUPPLY WITH E&C:

1) 85% of the basic value (excluding E&C charges) will be paid in 45 days, against usance draft of 45 days, from the date of AWB/BOL on submission of complete set of documents.

2) 15% of basic value (retention money), (excluding E&C charges) will be paid in 15 days from the date of completion of E&C along with E & C charges against supplementary invoice with proof of completion of E&C (if any).

(e) SUPPLY WITH SUPERVISION OF E&C:

1) 90% of the value of the order will be paid on the 45th day, against usance draft of 45 days, from the date of AWB/BOL on submission of complete set of documents.

2) 10% of basic value (retention money) will be paid in 15 days from the date of completion of erection and commissioning against supplementary invoice with proof of completion of E&C along with supervision charges (if any).

(f) SUPPLY ONLY:

1) 100% of PO value will be paid against usance draft of 45 days from the date of dispatch or 15 days from the date of submission of complete set of documents whichever is later.

LOADING FACTORS FOR PAYMENT TERMS:

1) For offers received with requests for negotiation of documents through bank loading will be 15% of basic value (all bank charges to be borne by the seller).
(This loading factor is applicable only for purchase orders for indigenous supply).

2) In all cases where credit period is 30 days but not in line with the above mentioned standard payment terms offered loading applicable will be 5% of basic value.
(This loading factor is applicable only for purchase orders for indigenous supply).

3) For offers received with Letter of Credit payment term in place of sight draft payment term, loading applicable will be 5% of basic value. Additional loading of 5% will be applicable for payment terms as Letter of Credit with usance of less than 45 days.
(This loading factor is applicable only for purchase orders for imported supply).

4) For offers received with Sight Draft payment terms with usance of less than 45 days, loading of 5% will be applicable.
(This loading factor is applicable only for purchase orders for imported supply).

5) All payment terms with credit period of less than 30 days for indigenous supply and any other variation of payment terms are liable for rejection.

6) Standard payment terms indicated in para F (a), (b), (c), (d), (e) and (f) will not attract any loading.

Note 1: Basic value of Purchase Order mentioned above will include all components of the purchase order and will exclude only taxes, duties, freight and E&C charges (wherever applicable).

Wherever the Purchase Order is split into import portion and indigenous portion of supply the retention money will be 15% or 10% (as applicable) of both purchase order values put together.

Note 2: ***If the E&C could not be completed till the end of the Warranty period due to reasons not attributable to the supplier, BHEL may consider releasing the retention money to the supplier against Bank Guarantee for equivalent value valid for an initial period of one year.***

G. <u>Bank guarantee (BG) / Performance bank guarantee (PBG):</u>

1. Bank guarantee (BG) / Performance bank guarantee (PBG) will be applicable as called in the tender documents refer SCC. Such PBG shall be valid for a period as called in SCC for a value equal to 10 % of the basic value of the purchase order. No deviation for the duration of PBG / BG will be permitted.
    a. PBG shall be from any of the BHEL consortium of bankers **(refer Annexure VI)**.
    b. PBGs from nationalized banks are also acceptable.
    c. PBG should be sent directly by the bank to the dealing executive mentioned in the purchase order located at the address mentioned in the purchase order. PBG should be in the format indicated. **(Refer annexures VII & VIII respectively)**. No deviation to these formats will be allowed.
    d. Confirmation from any of the BHEL consortium of banks or any of the Indian Public Sector Banks is essential for the acceptance of PBGs issued by foreign banks (located outside India).
    e. Expired BGs / PBGs will be returned only after expiry of the claim period or on completion of the contractual obligation.
    f. Non acceptance for submission of PBG will attract loading as indicated below
        i. Loading will be equal to the percentage of value for which BG / PBG is not provided. (Ex: if PBG / BG is given for 3 % of the basic value against 10% specified, loading applicable will be 7% (10 – 3 = 7 %). This value will be added to the quoted price while evaluating the lowest offer.

H. <u>PROVISONS APPLICABLE FOR MSE VENDORS (MICRO AND SMALL ENTERPRISES)</u>

Vendors who qualify as MSE vendors are requested to submit applicable certificates (as specified by the Ministry of Micro, Small and Medium Enterprises) at the time of vendor registration. Vendors have to submit any of the following documents along with the tender documents in the Part I / Technical bid cover to avail the applicable benefits.

a. Valid NSIC certificate or
b. Entrepreneur's Memorandum part II (EM II) certificate (deemed valid for 2 years).
c. EM II certificate with CA certificate **(in the prescribed format given in Annexure IX)** applicable for the year certifying that the investment in plant and machinery of the vendor is within permissible limits as per the MSME Act 2006 for relevant status where the deemed validity is over.
d. Documents submitted for establishing the credentials of MSE vendors must be valid as on the date of part I / technical bid opening for the vendors to be eligible for the benefits applicable for MSE vendors. Documents submitted after the Part I / Technical bid opening date will not be considered for this tender.

<u>PURCHASE PREFERENCE FOR MSE VENDORS:</u>

e. MSE vendors quoting within a price band of L1 + 15% shall be allowed to supply up to 20% of the requirement against this tender provided
    1. The MSE vendor matches the L1 price
    2. L1 price is from a non MSE vendor
    3. L1 price will be offered to the nearest vendor nearest to L1 in terms of price ranking (L2 - nearest to L1). In case of non-acceptance by the MSE vendor (L2) next ranking MSE vendor will be offered who is within the L1 + 15% band (if L3 is also within 15% band).
    4. 20% of the 20% (i.e. 4% of the total enquired quantity) will be earmarked for SC/ST owned MSE firms provided conditions as mentioned in (1) and (2) are fulfilled.

5. In case no vendor under SC / ST category firms are meeting the conditions mentioned in (1) and (2) or have not participated in the tender, in such cases the 4% quantity will be distributed among the other eligible MSE vendors who have participated in the tender.
6. Serial no. 1 to 5 will not be applicable wherever it is not possible to split the tendered quantity / items on account of customer contract requirement, or the items tendered are systems. Such information that tendered quantity will not be split will be indicated in the SCC.

I. INTEGRITY COMMITMENT IN THE TENDER PROCESS, AND EXECUTION OF CONTRACTS:

1. Commitment by BHEL:

   BHEL commits to take all measures necessary to prevent corruption in connection with the Tender process and execution of the Contract. BHEL will, during the tender process, treat all bidder / suppliers in a transparent and fair manner, and with equity.

2. Commitment by Bidder(s)/ Contractor(s):

   a. The Bidder(s)/ Contractor(s) commit(s) to take all measures to prevent corruption and will not directly or indirectly try to influence any decision or benefit which he is not legally entitled to.
   b. The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding or any actions to restrict competition.
   c. The Bidder(s)/ Contractor(s) will not commit any offence under the relevant Acts. The Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain or pass on to others, any information or document provided by BHEL as part of business relationship.
   d. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to the relevant guidelines issued from time to time by Government of India/ BHEL.

   If the Bidder(s) / Contractor(s), before award or during execution of the Contract commit(s) a transgression of the above or in any other manner such as to put his reliability or credibility in question, BHEL is entitled to disqualify the Bidder(s) / Contractor (s) from the tender process or terminate the contract and/ or take suitable action as deemed fit.

PURCHASE EXECUTIVE

ANNEXURE - I

LIST OF INTERNATIONAL GATEWAY AIRPORTS

For airbased consignment, terms of delivery will be on FCA basis from following listed airports only. This list is valid from 01.03.2013 to 28.02.2015.Vendors are requested to verify this list for use after 28.02.2015.

SCHEDULE NO	COUNTRY	CURRENCY CODE	AIRPORT
D01	UK	GBP	LONDON (HEATHROW)
D02	UK	GBP	NEW CASTLE
D03	UK	GBP	OXFORD. CHETLAM
D04	UK	GBP	BRISTOL. WELLINGBOROUGH
D05	UK	GBP	BIRMINGHAM
DO6	UK	GBP	EAST MIDLANDS
D07	UK	GBP	MANCHESTER
D08	UK	GBP	LEEDS
D09	UK	GBP	GLASGOW
D10	FRANCE	EURO	PARIS (ROISSY) & LYON
D11	SWEDEN	EURO	STOCKHOLM
D12	SWEDEN	EURO	GOTHENBERG & MALMO
D13	ITALY	EURO	ROMA, MILAN
D14	ITALY	EURO	TURIN, BOLOGNA, FLORENCE
D15	NETHERLANDS	EURO	AMSTERDAM, ROTTERDAM
D16	AUSTRIA	EURO	VIENNA, LINZ, GRAZ
D17	BELGIUM	EURO	ANTWERP, BRUSSELS
D18	DENMARK	DKK	COPENHAGEN
D19	JAPAN	JPY	TOKYO, OSAKA
D20	SINGAPORE	SGD	SINGAPORE
D21	CANADA	CAD	TORONTO
D22	CANADA	CAD	MONTREAL
D23	USA	USD	NEW YORK, BOSTON
D24	USA	USD	CHICAGO
D25	USA	USD	SAN FRANCISCO, LOS ANGELES
D26	USA	USD	ALANTA, HOUSTON
D27	GERMANY	EURO	MUNICH, KOLN, DUSSELDORF, HANNOVER, HAMBURG, STUTTGART, DAMSTADT, MANIHIEM, NURUMBERG
D28	GERMANY	EURO	FRANKFURT
D29	GERMANY	EURO	BERLIN
D30	SWITZERLAND	SFR	BASLE, ZURICH, GENEVA
D31	SPAIN	EURO	BARCELONA
D32	AUSTRALIA	AUD	SYDNEY
D33	AUSTRALIA	AUD	MELBOURNE
D34	AUSTRALIA	AUD	PERTH
D35	CZECH	EURO	PRAGUE
D36	HONG KONG	HKD	HONG KONG
D37	NEW ZELAND	NZD	AUCKLAND
D38	RUSSIA	USD	MOSCOW
D39	SOUTH KOREA	USD	KIMPO INTERNATIONAL, INCHEON
D40	FINLAND	EURO	HELSINKI
D41	ROMANIA	EURO	BUCHAREST
D42	NORWAY	EURO	OSLO
D43	IRELAND	EURO	DUBLIN
D44	ISRAEL	USD	TEL AVIV
D45	UAE	USD	DUBAI
D46	OMAN	USD	MUSCAT
D47	EGYPT	USD	CAIRO
D48	TAIWAN	USD	TAIPEI
D49	UKRAINE	USD	KIEV
D50	CHINA	USD	SHANGHAI, SHENZHEN
D51	PHILIPINES	USD	MANILA
D52	MALAYSIA	USD	KUALALUMPUR, PE NANG
D53	CYPRUS	USD	LARNACA
D54	SOUTH AFRICA	USD	JOHANNESBERG, DURBAN
D55	SLOVAKIA	EURO	BARTISLOVA
D56	SAUDI ARABIA	SAR	RIYADH
D57	TURKEY	EURO	ISTANBUL
D58	THAILAND	USD	BANGKOK
D59	BRAZIL	USD	SAO PAULO, RIO DE JANEIRO

ANNEXURE – II

DISCREPANCY IN WORDS & FIGURES – QUOTED IN PRICE BID

Following guidelines will be followed in case of discrepancy in words & figures-quoted in price bid:

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

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

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

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

ANNEXURE-III
GUIDELINES FOR REVERSE AUCTION PROCEDURE

Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to "REVERSE AUCTION PROCEDURE" i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit "online sealed bid" in the Reverse Auction. Non-submission of "online sealed bid" by the bidder for any of the eligible items for which techno-commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.
3. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
4. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
5. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
6. Bidders have to fax the Compliance form before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
7. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.
8. Reverse auction will be conducted on scheduled date & time.
9. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
10. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, as provided on case-to-case basis to Service provider within two working days of Auction without fail.
11. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL's standard practice.
12. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the "Business Rules of Reverse Auction", which will be communicated before the Reverse Auction.
13. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.
14. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.
15. In case BHEL decides to go for reverse auction, the H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.

16. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider) as well as 'Online sealed bid' in the Reverse Auction. Non-submission of 'Process compliance form' or 'Online sealed bid' by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with the offer. ***The envelope sealed price bid of successful L1 bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates.***

If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com)."

As a reminder to the bidders, system will flash following message (in RED Color) during the course of 'online sealed bid':

"Bidders to submit online sealed bid less than or equal to their envelope sealed bid already submitted to BHEL"

ANNEXURE - IV

Electronic Funds Transfer (EFT) OR

Paylink Direct Credit Form

Please Fill up the form in **CAPITAL LETTERS** only.

TYPE OF REQUEST(Tick one): _____ CREATE _____ CHANGE

BHEL Vendor / Supplier Code:

Company Name :

Permanent Account Number(PAN):

Address

City: PINCODE STATE

Contact Person(s)

Telephone No:

Fax No:

e-mail id:

1 Bank Name:

2 Bank Address:

3 Bank Telephone No:

4 Bank Account No:

5 Account Type: Savings/Cash Credit

6 9 Digit Code Number of Bank and branch appearing on MICR cheque issued by Bank

7 Bank IFSC Code(applicable for NEFT)

8 Bank IFSC code(applicable for RTGS) (Indian Financial System Code)

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

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

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

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

Date:

Authorised Signatory:

Designation: Telephone No. with STD Code

Company Seal

Bank Certificate

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

Date: (……...)

Place: Signature

Please return completed form **along with a blank cancelled cheque or photocopy** thereof to:

Bharath Heavy Electricals Ltd,

Attn:

Electronics Division, Mysore Road,

BANGALORE - 560 026

In case of any Querry, please call concerned purchase executive.

ANNEXURE - V
PRESENT PROCEDURE FOR SALE IN TRANSIT (HIGH SEA SALES)

In case of High Sea Sales, vendor should submit following documents:

1. **ORIGINAL HIGH SEA SALES AGREEMENT**
   - Sale agreement (on Rs. 200/- non-judicial stamp paper & notarised with 2 witnesses with identity) has to be signed between BHEL and the Party importing material. The date of the sale documents should be in between the date of House Air Way Bill / Bill of Lading and before landing of the goods in Indian origin.
   - The date of the stamp paper should be prior to the Air Way Bill / Bill of Lading date.
   - Following shall be included in the High Sea Sales Agreement:
     "THE BUYER ALSO UNDERTAKE DISCHARGES, THE OBLIGATION AND FULFILLMENT OF CONDITIONS, IF ANY, ATTACHED TO THE IMPORTATION, ASSESSMENT AND CLEARANCE OF THE GOODS IN TERMS CUSTOMS TARIFF ACT 1975, THE CUSTOMS ACT 1962 & RULES & REGULATIONS MADE THERE UNDER AND OTHER RELEVANT ACTS, ORDERS, NOTIFICATIONS**".**

2. **ORIGINAL INVOICES: INDIGENOUS RUPEE INVOICE & FOREIGN CURRENCY INVOICE**
   - Prices should be C.I.F., designated airport/seaport basis.
   - I.E.C., C.S.T., K.S.T. Nos. to be mentioned.
   - Description of item (Nomenclature), Unit & Quantity in both the Foreign Currency & the Indigenous Invoice in Rupee shall be exactly as per Purchase Order Description of item, Quantity and Unit. The Indigenous Invoice value shall be exactly as per Purchase Order value.
   - Seller should give Foreign Currency Invoice from the original consignor. The Foreign Currency Invoice value should be at least 2% (two per cent) less than the Indigenous Rupee Invoice value in equivalent foreign currency.

4. **ORIGINAL HOUSE AIR WAY BILL/ BILL OF LADING**
   - The sale agents should duly endorse House Air Way Bill (HAWB) for air shipments or original Bill of Lading (O.B.L.) for sea shipments and Foreign Currency Invoice in favour of BHEL-EDN.

5. **ORIGINAL CARGO ARRIVAL NOTICE FROM FORWARDER**.

6. **ORIGINAL DELIVERY ORDER ISSUED IN NAME OF BHEL-EDN.**

7. **ORIGINAL PACKING LIST.**

8. **A LETTER TO THE COMMISSIONER OF CUSTOMS FOR EFFECTING ABOVE SALE.**

9. **A LETTER TO THE DEPUTY ASSESSOR (OCTROI) FOR EFFECTING ABOVE SALE IN FAVOUR OF BHEL**.

REMARKS: In case vendor needs any clarifications on the above, the same may be sought in writing.

Annexure-VI

BHEL MEMBER BANKS (LIST OF CONSORTIUM BANKS)

BANK GUARANTEE (BG) SHALL BE ISSUED FROM THE FOLLOWING BANKS ONLY:

	Nationalised Banks		**Nationalised Banks**
1	Allahabad Bank	19	Vijaya Bank
2	Andhra Bank		**Public Sector Banks**
3	Bank of Baroda	20	IDBI
4	Canara Bank		**Foreign Banks**
5	Corporation Bank	21	CITI Bank N.A
6	Central Bank	22	Deutsche Bank AG
7	Indian Bank	23	The Hongkong and Shanghai Banking Corporation Ltd. (HSBC)
8	Indian Overseas Bank	24	Standard Chartered Bank
9	Oriental Bank of Commerce	~~25~~	~~The Royal Bank of Scotland N.V.~~
10	Punjab National Bank	26	J P Morgan
11	Punjab & Sindh Bank		**Private Banks**
12	State Bank of India	27	Axis Bank
13	State Bank of Hyderabad	28	The Federal Bank Limited
14	Syndicate Bank	29	HDFC Bank
15	State Bank of Travancore	30	Kotak Mahindra Bank Ltd
16	UCO Bank	31	ICICI Bank
17	Union Bank of India	32	IndusInd Bank
18	United Bank of India	33	Yes Bank

Note:

- All BGs must be issued from BHEL consortium banks listed above.
- BHEL may accept BG from other Nationalised Banks also which are not listed above.
- BG will not be accepted from Scheduled Banks and Co-operative Banks.
- In case BG is issued from a bank located outside Indian territory and is issued in foreign currency, the BG must be routed through and confirmed by any one of the above mentioned consortium banks or any of the Indian Public Sector Banks.
- This list is subject to changes. Hence vendors are requested to check this list every time before issuing BGs.

ANNEXURE-VII

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of the Bharat Heavy Electricals Limited [1] (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____ through its Unit at……..(name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) having its registered office at_____[2] hereinafter referred to as the 'Contractor/Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No……dated ……[3] valued at Rs……[4] (Rupees ----------)/FC…….(in words……..) for ……[5] (hereinafter called the 'Contract') and the Contractor having agreed to provide a Contract Performance Guarantee, equivalent to ……% (…. Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

we, ……, (hereinafter referred to as the Bank), having registered/Head office at ……. and inter alia a branch at …… being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer a maximum amount Rs ---------- (Rupees ----------) without any demur, immediately on a demand from the Employer, .

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. _____ _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor/ Supplier 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 Guarantee shall be a valid discharge of our liability for payment thereunder and the contractors/supplier shall have no claim against us for making such payment.

We the ……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 Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

We …….. BANK further agree with the Employer that the Employer 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 Contract or to extend time of performance by the said Contractor/Supplier from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Contractor/Supplier 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/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Contractor/Supplier 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.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

This Guarantee shall remain in force upto and including…….. [6] and shall be extended from time to time for such period as may be desired by Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor/Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the ……[7]we shall be discharged from all liabilities under this guarantee thereafter.

We, …… BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

a) The liability of the Bank under this Guarantee shall not exceed…… [8]
b) This Guarantee shall be valid up to ……[9]

c) Unless the Bank is served a written claim or demand on or before _____[10] all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Dated…….
Place of Issue…….

[1] NAME AND ADDRESS OF EMPLOYER I.e Bharat Heavy Electricals Limited

[2] NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.

[3] DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

[4] PROJECT/SUPPLY DETAILS

[5] BG AMOUNT IN FIGURES AND WORDS

[6] VALIDITY DATE

[7] DATE OF EXPIRY OF CLAIM PERIOD

[8] BG AMOUNT IN FIGURES AND WORDS.

[9] VALIDITY DATE

[10] DATE OF EXPIRY OF CLAIM PERIOD

ANNEXURE-VIII

Note for performance bank guarantee:

1. To be executed in Rs. 100/- Non-Judicial stamp paper.
2. To be submitted by issuing bank to Purchase Dept. directly. Please give BHEL address to banker.
3. Do not enclose with Bank document.
4. Modifications and additions/deletions to this BG format shall not be permitted.
5. **In Case of Bank Guarantees submitted by Foreign Vendors-**

   a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

   b. **From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**

   b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.

   b.2 **In case, Foreign Vendors intend to provide BG from** Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.

   b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.

   b.4 The BG should clearly specify that the demand or other document can be presented in electronic form.

Annexure - IX

Certificate by Chartered Accountant on Letter Head

This is to certify that M/s ……..…………………………………………………..……………………… …………………………………….… …………………………………………..(Hereinafter referred to as `Company') having its registered office at ……………………………………… is registered under MSMED Act 2006, (Entrepreneur Memorandum No (Part-II …………………………… dtd ……………………………… Category: ……………………… (Micro/Small). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as on date**………………….. as per MSMED Act 2006 is as follows:**

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e., original cost excluding land and building and the items specified by the Ministry of Small Industries vide its notification No.S.O.1722 (E) dated October 5, 2006:

2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED Act, 2006:

Rs. ……………………………….Lacs.

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

Date:

(Signature)

Name -
Membership Number -
Seal of Chartered Accountant

Guidelines for Indian Agents
ANNEXURE - X

- Definition of Indian Agent: An Indian Agent of foreign prinicipal is an individual, a partnership, an association of persons, a private or pubile company, that carries our specific obligation(s) towards processing of BHEL tender or finalization or execution of BHEL's contract on behalf of the foreign supplier.

In case of yes, vendor to note the following and reply accordingly:

i. BHEL shall deal directly with foreign vendors, wherever required, for procurement of goods. However, if the foreign principal desires to avail of the services of an Indian agent, then the foreign principal should ensure compliance to regulatory guidelines - which require mandatory submission of an Agency Agreement.

ii. It shall be incumbent on the Indian agent and the foreign principal to adhere to the relevant guidelines of Government of India, issued from time to time.

iii. The Agency Agreement should specify the precise relationship between the foreign OEM / foreign principal and their Indian agent and their mutual interest in the business. All services to be rendered by agent/ associate, whether of general nature or in relation to the particular contract, must be clearly stated by the foreign supplier/ Indian agent. Any payment, which the agent or associate receives in India or abroad from the OEM, whether as commission or as a general retainer fee should be brought on record in the Agreement and be made explicit in order to ensure compliance to laws of the country.

iv. Any agency commission to be paid by BHEL to the Indian agent shall be in Indian currency only.

v. Tax deduction at source is applicable to the agency commission paid to the Indian agent as per the prevailing rules.

vi. In the absence of any agency agreement, BHEL shall not deal with any Indian agent (authorized representatives / associate / consultant, or by whatever name called) and shall deal directly with the foreign principal only for all correspondence and business purposes.

vii. The "Guidelines for Indian Agents of Foreign Suppliers" enclosed at annexure –'A' shall apply in all such cases.

viii. The supply and execution of the Purchase Order (including indigenous supplies/ service) shall be in the scope of the OEM/ foreign principal. The OEM/ foreign principal should submit their offer inclusive of all indigenous supplies/ services and evaluation will be based on 'total cost to BHEL'. In case OEM/ foreign principal recommends placement of order(s) towards indigenous portion of supplies/ services on Indian supplier(s)/ agent on their behalf, the credentials/ capacity/ capability of the Indian supplier(s)/ agent to make the supplies/ services shall be checked by BHEL as per the extant guidelines of Supplier Evaluation, Approval & Review Procedure (SEARP), before opening of price bids. In this regard, details may be checked as per Annexure-B (copy enclosed). It will be the responsibility of the OEM/ foreign principal to get acquainted with the evaluation requirements of Indian supplier/ agent as per SEARP available on www.bhel.com.

The responsibility for successful execution of the contract (including indigenous supplies/ services) lies with the OEM/ foreign principal. All bank guarantees to this effect shall be in the scope of the OEM/ foreign principal.

---x---

Vendor's Signature with Seal

Annexure-A

Guidelines for Indian Agents of Foreign Suppliers

1.0 There shall be compulsory registration of agents for all Global (Open) Tender and Limited Tender. An agent who is not registered with BHEL shall apply for registration in the registration form in line with SEARP.

1.1 Registered agents will file an authenticated Photostat copy duly attested by a Notary Public/Original certificate of the Principal confirming the agency agreement and giving the status being enjoyed by the agent and the commission/ remuneration/ salary/ retainership being paid by the principal to the agent before the placement of order by BHEL.

1.2 Wherever the Indian representatives have communicated on behalf of their principals and the foreign parties have stated that they are not paying any commission to the Indian agents, and the Indian representative is working on the basis of salary or as retainer, a written declaration to this effect should be submitted by the party (i.e. Principal) before finalizing the order.

2.0 Disclosure of particulars of agents/ representatives in India, if any.

2.1 Tenderers of Foreign nationality shall furnish the following details in their offers:

2.1.1 The Bidder(s)/ Contractor(s) of foreign origin shall disclose the name and address of the agents/ representatives in India if any and the extent of authorization and authority given to commit the Principals. In case the agent/ representative be a foreign Company, it shall be confirmed whether it is existing Company and details of the same shall be furnished.

2.1.2 The amount of commission/ remuneration included in the quoted price(s) for such agents/ representatives in India.

2.1.3 Confirmation of the Tenderer that the commission/ remuneration, if any, payable to his agents/ representatives in India, may be paid by BHEL in Indian Rupees only.

2.2 Tenderers of Indian Nationality shall furnish the following details in their offers:

2.2.1 The Bidder(s)/ Contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any, indicating their nationality as well as their status, i.e. whether manufacturer or agents of manufacturer holding the Letter of Authority of the Principal specifically authorizing the agent to make an offer in India in response to tender either directly or through the agents/ representatives.

2.2.2 The amount of commission/ remuneration included in the price (s) quoted by the Tenderer for himself.

2.2.3 Confirmation of the foreign principals of the Tenderer that the commission/ remuneration, if any, reserved for the Tenderer in the quoted price(s), may be paid by BHEL in India in equivalent Indian Rupees on satisfactory completion of the Project or supplies of Stores and Spares in case of operation items.

2.3 In either case, in the event of contract materializing, the terms of payment will provide for payment of the commission/ remuneration, if any payable to the agents/ representatives in India in Indian Rupees on expiry of 90 days after the discharge of the obligations under the contract.

2.4 Failure to furnish correct and detailed information as called for in paragraph 2.0 above will render the concerned tender liable to rejection or in the event of a contract materializing, the same liable to termination by BHEL. Besides this there would be a penalty of banning business dealings with BHEL or damage or payment of a named sum.

---x---

Disclaimer Certificate For Deemed Export Benefits

I, (Name & Designation) …..on behalf of M/s. ….. (Name and address of the supplier) hereby certify that we have supplied the following goods to M/s….. (Name and address of the recipient):

S.No.	Inv. No. & date	Description of goods	Unit	Qty.	Value

1. We are the manufacturer exporters/suppliers and are registered/not registered with Central Excise and have not availed and will not avail CENVAT facility in respect of the input/components used in aforesaid supplies. We have also not availed and will not avail rebate on the inputs/components used in aforesaid supplies.

OR

We are the suppliers and our supporting manufacturer(s) is/are registered/not registered with Central Excise and have not availed and will not avail CENVAT facility in respect of the inputs/components used in aforesaid supplies.

2. We also certify that we have not been issued any Advance Authorization/Duty Free Import Authorization in respect of the aforesaid supplied goods and have not availed any benefit thereon.

3. We further state that we have not drawn nor will draw any benefit for deemed export and we have no objection if M/s…… (Name and address of the recipient) draws the deemed export benefits on the supplies mentioned above. (Required to be given in case benefits are claimed by recipient of goods).

OR

We have not given disclaimer certificate to M/s…… (Name and address of the recipient) and will not give disclaimer certificate, in future, in respect of these supplies for claiming deemed export benefits (Required to be given in case benefits are claimed by DTA suppliers).

"Purchase Orders for HSS procurement

Annexure-XII
High sea sales payment term:

(a) SUPPLY WITH E&C:

85% basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation whichever is later. 15% of basic value (retention money), will be paid in 15 days from the date of completion of erection and commissioning against supplementary invoice with proof of completion of E&C

(b) SUPPLY WITH SUPERVISION OF E&C:

90% basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation whichever is later. 10% of basic value (retention money), will be paid in 15 days from the date of completion of Supervision of erection and commissioning against supplementary invoice with proof of completion of E&C

(c) SUPPLY ONLY:

100% basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation whichever is later.

LOADING FACTORS FOR PAYMENT TERM:

In all cases where credit period is 30 days with the above offered standard payment terms, loading applicable will be 5% of basic value.

All payment terms with credit period of less than 30 days and any other variation of payment terms are liable for rejection."

ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
भारत हेवी इलेक्ट्रिकल्स लिमिटेड
Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division
PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE: PR: 003- Rev 00

SPECIAL COMMERCIAL CONDITIONS OF CONTRACT

Reference is brought to BHEL's Instructions to Bidders (Document Ref: CE: PR: 001- Rev 00) and General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 00). These two documents along with Special Conditions of Contract annexed to this RFQ will form an integral part of the contract as and when the RFQ culminates into a Purchase Order / Contract.

RFQ No: NKR0000220 **RFQ Date:** As per EPS
Due Date: AS PER EPS **Project:** Ennore 2X660MW & North Chennai 1X800M
Item Description: CCTV System (Plant Security System)

~~**Purchase Executives:** In cases where tender documents are bulky, or due to some reasons tender documents are required to be submitted by hand, the offers are to be handed over to either of the following Purchase Officers: Mr.Nilmani Kumar , Engineer,CE-MM-PR_or Mr.H D CHANDRAIAH,Sr.Manager,CE-MM-PR~~

~~**E-mail IDs:** In case offers are sent through E-mail, please send the offers to both of the following email IDs: nilmanikumar@bheledn.co.in& ponnuguru@bheledn.co.in~~

E-tendering: Applicable ~~**/ Not Applicable**~~

Type of Bid: Three part Bid system (Refer clause B of ITB)

Reverse Auction: ~~Not Applicable~~ / Will be intimated during commercial clarifications to technically acceptable vendors.
In case BHEL does not resort to Reverse Auction, the price bids and price impacts (if any) shall be opened as per BHEL's standard practice.

Splitting of tendered quantity to MSE vendors: The tendered quantity ~~will~~ /will not be split to MSE vendors ~~subject to submission of relevant documents by vendors. **Refer clause H of Instructions to Bidders for conditions applicable and for information on documents to be submitted.**~~

Destination : a) For indigenous supply Items are to be directly despatched to BHEL's Site Office or Stores/Customer's Stores of respective site located at/near **Chennai, Tamilnadu**. Road Permit, if applicable, will be issued by BHEL along with Despatch Clearance.
b) For Import supply – Port of discharge will be any port in India and port of delivery will be ICD-Bangalore

Project Benefits:

Indigenous scope of supply:

- **Imported scope of supply:**
  - **a) Merit duty is applicable**
  - ~~b) Project is Mega Power Project or Ultra Mega Power Project: Eligible for "NIL" Customs Duty.~~
  - ~~c) Physical Export project: Eligible for complete exemption of Customs Duty.~~

Terms of Delivery:
Indicate station of despatch:
Indicate place of manufacturing (wherever applicable): _____

- **Indigenous scope of supply:** Ex-works (including Packing & Forwarding charges but excluding Taxes & Duties): _____
- **Imported scope of supply:** F.C.A. (for air consignments) /ICD-Bangalore. (for sea consignments) (including Packing, Forwarding, Handling, Ancillary charges like processing of Sight Draft/ Letter of Credit, negotiation of bank documents, Export declaration, Country of Origin etc): _____

Sl. NO.	TERMS	BHEL ACCEPTABLE TERM	BIDDER'S CONFIRMATION	DEVIATION IF ANY
01	**Validity**	The offer will be valid for a period of 120 days from the date of technical bid opening.	**AGREE**	
02	**Delivery Period**	Within 08 weeks from the date of issue of approved documents or manufacturing clearance by BHEL, whichever is later.	**AGREE** ……Weeks	
03	**Guarantee/ Warranty**	36 months from the date of delivery of goods or 30 months from the date of commissioning of goods, whichever is earlier.	**AGREE**	
04	**Inspection agency**	Materials will be inspected by : • BHEL • Customer/Consultant/BHEL nominated Third Party Inspection Agency (TPIA)	**AGREE**	
05	**Terms of Payment at the time of material supply**	Refer Clause "F" of Instructions to Bidder for BHEL standard Payment terms and loading factors applicable for non-compliance against payment terms: **Indigenous Scope:** **a)Supply with E&C** ~~b)Supply with Supervision of E&C~~ ~~c) Supply only~~ **Imported Scope~~:~~** **d)Supply with E&C** ~~e)Supply with Supervision of E&C~~ ~~f) Supply only~~ Note: Kindly indicate if High Sea Sales will be operated. If yes, confirm submission of relevant documents as per Annexure V.	**AGREE** **YES / NO** **CONFIRMED**	
06	**Performance Bank Guarantee (PBG)**	PBG will be applicable for a period of 36 months + claim period of 6 months for a value equal to 10% of the basic value of the purchase order. Refer Clause "**G**" of Instructions to Bidders.	**AGREE**	
07	**Terms of Payment not related to material supply**	**For Training:** 100% will be paid in 45 days from the date of completion of Training or 15 days from the date of submission of complete set of documentation, whichever is later.Separate invoice shall be submitted for Training charges along with documentary evidence. ~~**For Engineering & Documentation Charges:**~~ ~~100% will be paid in 45 days from the date of approval of final documents or 15 days from the date of submission of invoice, whichever is later. Separate invoice to be submitted for Engineering & documentation charges.~~	~~**AGREE**~~	
08	**Mode of despatch**	**Indigenous Scope:** By Road on Door Delivery Consignee Copy attached basis through your approved transporter (unless otherwise indicated in Despatch Instructions), only on receipt of Despatch Clearance from BHEL. **Imported Scope:** By Air/Sea through BHEL approved Consolidator/Freight Forwarder, only on receipt of Despatch Clearance from BHEL.	**AGREE**	
09	**Despatch Documents**	Complete set of despatch documents (original + 1 photocopy set) as per Purchase Order shall be forwarded to BHEL directly. Depending upon the project/customer demands, despatch documents may include one or more documents from the following: GST Invoice* (Refer clause related to GST for invoicing) Lorry Receipt (L/R), Packing List, Air Way Bill (AWB), Country of origin certificate, Warranty Certificate, Insurance Intimation letter, NIL Short Shipment Certificate, Original Performance Bank Guarantee (directly from issuing bank to BHEL), POD (Proof of Delivery) on	**AGREE**	

		original L/R, Disclaimer Certificate (as per BHEL format attached as Annexure XI) along with ER-1 form & attested excise invoice (as per project demands like Nuclear Power plant) etc. **Apart from the above list, further despatch documents needed, for a particular project will be specified in the Purchase Order.** One set of Invoice, Packing List and L/R or AWB shall be e-mailed/faxed immediately to BHEL-EDN after despatch.		
10	**O & M Manuals**	As built Drawings, O & M Manuals and other approved documents shall be furnished in required no. of sets as per Specification/Purchase Order. Note: Supply of above documents (O&M) in required no. of sets along with material shall be indicated in packing list. If not mentioned BHEL may insist for submission in required sets once again.	**AGREE**	
11	~~**Quantity Tolerance**~~	~~If applicable, indicate Quantity tolerance for each of the line item. For Impulse/seamless/ GI pipes one random length applicable for each variety of pipes.~~	~~**CONFIRMED**~~	~~Quantity Tolerance ..... % Per Variety~~
12	**Evaluation criteria for tendered item**	Items will not be split on item wise lowest offer. All the items in the tender will be evaluated and procured as a SINGLE package i.e. ordering will be done on Single L1 vendor.	**AGREE**	
13	**Integrity Commitment**	Integrity commitment will be applicable in the tender process and execution of contracts as mentioned in clause "**I**" of Instructions to Bidders.	**AGREE**	

IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. A panel of Independent External Monitors (IEMs) have been appointed to oversee implementation of IP in BHEL.

The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory who signs in the offer on all 8 pages) along with techno-commercial bid. Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

(a). Details of IEM for this tender is furnished below:

Name : Shri D.R.S Chaudhary, IAS (Retd.)
Address : Flat No. L-202 & L-203 (1st Floor)
Ansal Lake View Enclave
Shamla Hills, Bhopal- 462 013 (M.P.)
Phone : +91 755 4050495
Email : dilip.chaudhary@icloud.com

(b). Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to the IEM mentioned in the tender.

Note: No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department.

With this, it is inferred that vendor has understood and accepts all terms & conditions as indicated in Instructions to Bidders (Document Ref: CE: PR: 001- Rev 00) & General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 00).

VENDOR'S SIGNATURE WITH SEAL

NOTE: The above filled-in and signed document shall be uploaded in EPS as part of Part-I Bid without fail. If no deviations are brought, it will be treated as if all terms and conditions of this enquiry are accepted by vendor without any deviation.

GUIDELINES FOR QUOTING IN E-PROCUREMENT SYSTEM

1. **Wherever item required is one set, vendor has to mandatorily give break-up of items as per Bill of material of specification in Techno-commercial bid as attachment and Break-up price for each item in price bid as attachment. In case of difference in total as per Break-up price given and EPS portal price bid, price quoted in EPS portal price bid only will be final and considered for evaluation.**
2. Price quoted by vendors in the EPS portal price bid will be final and other price quoted anywhere else in the attachment will deemed to be invalid.
3. Final comparative statement and ranking will subject to evaluation considering the other price impacts like loading factor and tax credit available to BHEL.
4. Any technical or commercial clarification for this tender can be raised on or before **22.01.2018**. No clarification will be entertained by BHEL after given cutoff date.
5. Refer attached SCC for applicable special commercial condition for the tender. Vendors to quote commercial terms in EPS portal after referring attached SCC. Commercial terms quoted in EPS portal only will be final. Deviation, if any, should be clearly brought out in EPS portal.
6. Any additional commercial term or deviation in commercial term, if sought by any vendor, should be clearly brought out in EPS portal. Any additional commercial term or deviation in commercial term mentioned anywhere else shall be ignored and not be considered for evaluation.
7. If any vendor is not having Digital Signature Certificate (Signing + Encryption) and willing to participate in the tender, vendor need to inform BHEL through email at least three days prior to due date for tender submission and request BHEL for extension of due date. Vendor has to submit the proof of application for getting new DSC and expected date of getting new DSC along with their request. Otherwise their request will not be considered. Based on the above BHEL will take suitable action. If any vendor is requesting for due date extension for getting fresh DSC and not quoting for the tender even after due date extension, it will be viewed seriously by BHEL and action will be taken as per BHEL policy and procedures.
8. IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. A panel of Independent External Monitors (IEMs) have been appointed to oversee implementation of IP in BHEL.

   The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory who signs in the offer **on all 8 pages**) along with techno-commercial bid. Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

   (a). Details of IEM for this tender is furnished below:

   Name : Shri D.R.S Chaudhary, IAS (Retd.)
   Address : Flat No. L-202 & L-203 (1st Floor)
   Ansal Lake View Enclave
   Shamla Hills, Bhopal- 462 013 (M.P.)
   Phone : +91 755 4050495
   Email : dilip.chaudhary@icloud.com

   (b). Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to the IEM mentioned in the tender.

Note: No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department.

INTEGRITY PACT

Between

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

and

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

Preamble

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

_____

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

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

Section 1 – Commitments of the Principal

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

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

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

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

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

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

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

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved

in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

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

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

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

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

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

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

Section 4 – Compensation for Damages

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

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

Section 5 – Previous Transgression

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

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

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

6.1 The Bidder(s)/ Contractor(s) undertake(s) to obtain from all subcontractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20 % of Bidder's/ Contractor's contract value with the Principal. The Bidder(s)/ Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).

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

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

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

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

Section 8 –Independent External Monitor(s)

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

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

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

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

8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

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

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

8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC / PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the

Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

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

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

Section 9 – Pact Duration

9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

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

Section 10 – Other Provisions

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

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

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

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

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

For & On behalf of the Principal

(Office Seal)

For & On behalf of the Bidder/ Contractor

(Office Seal)

Place----------

Date----------

Witness: _____

(Name & Address) _____

_____

Witness: _____

(Name & Address)_____

_____