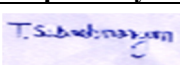
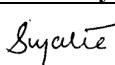
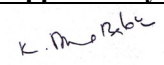


ESP-001- 2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION				Std. / Doc. Number	
						PY 56394	
						Rev. No.	00
						Sheet 1 of 12	

COPYRIGHT AND CONFIDENTIAL
The information on this document is the property of **BHARAT HEAVY ELECTRICALS LIMITED**,
It must not be used directly or indirectly in any way detrimental to the interest of the company.

Technical Specification for Fire Detection & Alarm System Project: 3x800MW Patratu TPS

		Prepared by :	Checked by :	Approved by :	Date :
Revisions: Refer to record of revisions		T.Subrahmanyam			13.02.2020

ESP-001- 2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION		Std. / Doc. Number	
				PY 56394	
				Rev. No.	00
				Sheet 2 of 12	

1. SCOPE:

- 2.1 Design, Engineering, Manufacturing, Assembly, System Integration, testing at vendor works, Inspection by purchaser, Supply (Packing and Transportation to sites), Installation Support and commissioning of Fire Detection and Alarm System.
- 2.2 The material supply and installation shall be done as per the applicable codes and standards. Responsibility of the bidder is up to final handover of FDA systems to End user.
- 2.3 Training of End user / purchaser's manpower to operate and maintain the system.
- 2.4 Supply of complete documentation covering design, sizing, installation, operation and maintenance aspects and technical details of bought out components, as-built drawings & Device charts of the system and tests carried out during commissioning.

2. INSTRUCTIONS TO BIDDERS

- 2.1 Bidders are advised to contact BHEL for essential technical queries in writing within one week of issue of Enquiry. In the event of any conflict between these specifications, data sheets, related standards, codes etc. the vendor shall refer the matter to the purchaser for clarifications before bid submission and the decision of Purchaser shall be final & binding on Bidder, without any cost & delivery implications. However, in the event of conflict, most stringent requirements shall be followed.
- 2.2 Offers with incomplete information will not be considered for evaluation, and are likely to be rejected outright without any further interaction with the Bidder.
- 2.3 Any technical features [over & above BHEL enquiry specification requirements] proposed by Bidder will not be given preference for the purpose of evaluation.
- 2.4 Bidder shall submit the "Duly filled & Signed copy of Check list" compulsorily along with technical offer without which offer is liable for rejection without any further interaction with the Bidder

3. CODES, STANDARDS & REGULATIONS

- 3.1 Tariff Advisory Committee (TAC)/LPA India/NFPA USA
- 3.2 Underwriters Laboratories (UL)-USA,
- 3.3 VDS Standards,
- 3.4 Loss Prevention Certification Board (LPCB),
- 3.5 Factory Mutual (FM),
- 3.6 Indian Electricity (Supply) Act (IEA)
- 3.7 Rules for Fire Alarm System of India, and
- 3.8 IS 2189 (Selection, Installation and Maintenance of Automatic Fire Detection and Alarm System-Code of Practice).
- 3.9 Any other equivalent internationally recognized body acceptable to BHEL/End customer.

4. List of Annexures (To followed along with this specification)

Document No.	Document Name
Annexure – [A]	Bill of material [for Main Supply + Mandatory Spares]
Annexure – [B]	Technical Specification for FDA System
Annexure – [C]	Price Bid format [for Main Supply + Mandatory Spares+Services]
Annexure – [D]	Schematic Diagram for Fire Detection & Alarm System
Annexure – [E]	Pre Bid Query Format
Annexure – [F]	Master Document Schedule
Annexure – [G]	Vendor List
Annexure – [H]	Quality Requirements

ESP-001- 2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION		Std. / Doc. Number	
				PY 56394	
				Rev. No.	00
				Sheet 3 of 12	

5. **CHECK LIST** (To be filled by BIDDER and submitted along with Technical offer compulsorily)
Vendor shall submit the following documents mandatorily as part of COMPLTE technical offer.

Enquiry No. / Date

Name of the Bidder

Project Name

Item Description

Sl.No	Document	Bidder confirmation (Yes/No)	Remarks
1	Technical offer complies with the specifications and its associated annexures, pre-bid clarifications in Toto and there are no technical deviations. Signed and stamped copy of this specification along with annexures enclosed along with technical offer.		
2	In case of deviation, vendor to confirm that these are technically not feasible deviations and same are submitted in BHEL format. In case technically feasible deviations are proposed by the bidder and subsequently withdrawn, no commercial implications can be claimed by the bidder		
3	All items are manufactured conforming to latest version of material grade standard and manufacturing standard mentioned in this specifications		
4	Bidder to quote as per BHEL price format only. No other format is acceptable. Bidder to attach un-priced price bid format by indicating "QUOTED" against each item and submit with technical offer duly signed & stamped.		
5	For addition/reduction of quantity, unit rate quoted in the present offer shall be considered during ordering and shall be valid up to execution of the contract to the extent of $\pm 10\%$ of order Value.		
6	Bidder to agree that Bill of materials / list of equipment furnished in the offer is only for information; Vendor shall supply all the material to meet the performance, sizing & technical requirement as per specification & its Annexures, scope matrix etc.		
7	Confirm that the quote includes training, commissioning spares, special tool & tackles, mounting hardware/ accessories, terminations, networking components etc. as required for commissioning activities.		
8	Bidder to confirm that all networking components/ hardware software, licenses as required for complete functional operation of the all systems are included.		
9	All the equipments / items / sensors / detectors etc., supplied by bidder are having valid statutory approval certificates and same will be produced at any stage of contract execution to BHEL. The same were eligible to take local statutory regulatory body approval during commissioning of the system		

(Bidder's Signature and stamp with date)

ESP-001- 2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION					Std. / Doc. Number
							PY 56394
							Rev. No. 00
							Sheet 4 of 12

6. SCOPE MATRIX FOR SUPPLY, ENGG AND INSTALLATION & COMMISSIONING

S.No.	Description	Engineering by	Supply by	Erection by	Supervision of Erection by	Commissioning by	Remarks
[A] Fire Detection & Alarm System							
1	FDA System [Fire alarm panels, repeater panel, Operating Station, Softwares, including all erection & commissioning hardwares].	Bidder (Note-3)	Bidder	BHEL	Bidder (Note-1,2)	Bidder + BHEL (Note-2)	Refer Annexure-[A], [B], [C], [D] & [G] for inputs
2	Detectors, control modules, hooters, call points & all other devices	BHEL	Bidder	BHEL	Bidder (Note-1,2)	Bidder + BHEL (Note-2)	Refer Annexure-[A] for BOM
3	Network Components like Switches, LIUs, Patch Cards, Media converters, etc.	Bidder	Bidder	BHEL	Bidder (Note-1,2)	Bidder + BHEL (Note-2)	
4	Network & Fiber optic Cables	Bidder	Bidder	BHEL (Note-4)	Bidder (Note-1,2)	Bidder + BHEL (Note-2)	Bidder refer annexure-[A], [B] & [D] for inputs
5	Interface / integration of FDA system with DCS (including supply of necessary hardwares + softwares)	Bidder	Bidder	BHEL	Bidder (Note-1,2)	Bidder + BHEL (Note-2)	
6	Erection hardware required for FDA system including accessories required for termination of BHEL supplied cables.	Bidder	Bidder	BHEL	Bidder (Note-1,2)	Bidder + BHEL (Note-2)	Refer Annexure-[A] to [D] for inputs

Notes:

- 1) Termination accessories and termination of all types of cables at bidder-supplied items/panels shall be in Bidder scope.
- 2) BHEL will provide the necessary man power required for commissioning. However system commissioning shall be done by bidder only.
- 3) Engineering of Panels, Loop cards, model selections, configuration of software etc are part of Bidder scope.
- 4) Any special activities involved in erection like FO cable splicing, termination, etc. shall be by bidder.

7. TECHNICAL SPECIFICATIONS

S. No.	System	Technical specifications
[A] Fire Detection & Alarm System		
1	Bill of material	Refer Annexure-[A] of this specification for <u>Main Supply</u> + <u>Mandatory Spares</u>
2	Technical requirements	1) Refer Annexure-[B] & [D] of this specification 2) Software Licenses shall be valid for life time. 3) Bidder to confirm that entire FDA System shall be subject to approval by TAC accredited agency to qualify maximum premium discount. Responsibility to get

ESP-001- 2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION		Std. / Doc. Number	
				PY 56394	
				Rev. No.	00
				Sheet 5 of 12	

		approval from TAC Accredited agencies shall rest on BHEL. However all necessary documentation for obtaining such approvals are in bidder's scope. 4) Addressable type repeater annunciation panel in central fire station with power supply system (batteries and battery chargers, suitable for providing battery backup of 24 hours (stand by) and 30 minutes (in alarm conditions), etc. 5) Software and hardware as required to provide a complete functioning of the system.
3	Cable sizes for selecting the FDA system make and models	Following cables shall be supplied by BHEL for LOOP and POWER cables of FDA system. Bidder shall select the detectors / panels / devices models considering below cable sizes: Loop Cable: 2C x 1.5 Sqmm (Screened & twisted armoured cable) Power Cable: 2C x 2.5 Sqmm (Screened & twisted armoured cable)
4	Other technical requirements	1) Engineering of Panels, Loop cards, model selections, configuration of software's, etc. are part of Bidder scope. 2) Bidder to ensure the Vetting of the above sizing and selection by OEM. 3) Remote manual operation of the deluge valves shall be possible from the respective fire alarm control panel through the keyboard operation of PC monitoring station when the system is selected in remote manual mode
5	Network Switch	All the network switches shall be of high quality and shall be sized to meet the functional requirements as specified. All the interconnecting cables between network switches shall be fiber optic only. All fiber optic cables shall be terminated directly to network switches through optical fiber port without using media converters. Bidder to ensure that minimum 100% cores are kept as spares in all type of optical fiber cables.
6	Junction Boxes	Junction box shall be made of Fire retardant material. Material of JB shall be Thermoplastic or thermosetting or FRP type. The box shall be provided with the terminal blocks, mounting bracket and screws etc. The cable entry shall be through galvanized steel conduits of suitable diameter. The JB shall have suitable for installing glands of suitable size on the bottom of the box. The JB shall be suitable for surface mounting on ceiling/structures. The JB shall be of grey color RAL 7035. All the metal parts shall be corrosion protected. Junction box surface should be such that it is free from crazings, blisterings, wrinkling, colour blots/striations. There should not be any mending or repair of surface. JB's will be provided with captive screws so that screws don't fall off when cover is opened. JB's mounting brackets should be of powder coated MS. Type test reports for the following tests shall be furnished:- (a) Impact resistance for impact energy of 2 Joules (IK07) as per BS EN50102 (b) Thermal ageing at 70deg C for 96 hours as per IEC60068-2-2Bb. (c) Class of protection shall be IP 55. d) HV test. Terminal blocks shall be 1100V grade, of suitable current rating, made up of unbreakable polyamide 6.6 grade. The terminals shall be screw type or screw-less (spring loaded) / cage clamp type with lugs. Marking on terminal strips shall correspond to the terminal numbering in wiring diagrams. All metal parts shall be of non-ferrous material. In case of screw type terminals the screw shall be captive, preferably with screw locking design. All terminal blocks shall be suitable for terminating on each side the required cables/wire size. All internal wiring shall be of cu. Conductor PVC wire.
7	Cable glands	Cable shall be terminated using double compression type cable glands. Testing requirements of Cable glands shall conform to BS:6121 and gland shall be of robust Construction capable of clamping cable and cable armour (for armored cables) firmly without injury to insulation. Cable glands shall be made of heavy-duty brass machine finished and nickel chrome plated. Thickness of plating shall not be less than 10 micron. All washers and hardware shall also be made of brass with

ESP-001- 2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION		Std. / Doc. Number	
				PY 56394	
				Rev. No.	00
				Sheet 6 of 12	

		nickel chrome plating Rubber components shall be of neoprene or better synthetic material and of tested quality. Cable glands shall be suitable for the sizes of cable supplied/erected.
8	Cable lugs/ferrules	Cable lugs/ferrules for power cables shall be tinned copper solderless crimping type suitable for aluminium compacted conductor cables. Cable lugs and ferrules for control cables shall be tinned copper type. The cable lugs for control cables shall be provided with insulating sleeve and shall suit the type of terminals provided on the equipments. Cable lugs and ferrule shall conform to DIN standards.
9	Cable Clamps & Ties	The cable clamps/ties required to clamp multicore cables shall be of SS-316 material, 12mm wide, polyster coated ladder lock type. The clamps/ties shall have self locking arrangement & shall have sufficient strength. The cable clamps/ties shall be supplied in finished individual pieces of suitable length to meet the site requirements.
10	Optical fibre cables	Optic Fiber cable shall be 8 core, Electrolytic ally chrome plated corrugated steel taped (ECCST), fully water blocked with dielectric central member for outdoor/indoor application so as to prevent any physical damage. The cable shall have multiple single-mode or multi mode fibers on as required basis so as to avoid the usage of any repeaters. The outer sheath shall have Flame Retardant, UV resistant properties and are to be identified with the manufacturer's name, year of manufacturer, progressive automatic sequential on-line marking of length in meters at every meter. The cable core shall have suitable characteristics and strengthening for prevention of damage during pulling viz. Dielectric central member, Loose buffer tube design, 4 fibers per buffer tube (minimum), Interstices and buffer tubes duly filled with Thixotropic jelly etc. The cable shall be suitable for a maximum tensile force of 2000 N during installation, and once installed, a tensile force of 1000 N minimum. The compressive strength of cable shall be 3000 N minimum & crush resistance 4000 N minimum. The operating temperature shall be -20 deg. C to 70 deg. C All testing of the fiber optic cable being supplied shall be as per the relevant IEC, EIA and other international standards. Bidder to ensure that minimum 100% cores are kept as spares in all types of optical fibre cables. Cables shall be suitable for laying in conduits, ducts, trenches, racks and under ground buried installation. Spliced / Repaired cables are not acceptable. Penetration of water resistance and impact resistance shall be as per IEC standard.
11	Operator Workstation & A4 size color laser Printer along with Graphic software i.e., (GUI) Software	CPU : Latest generation CPU Removable bulk storage drive (MOD / DVD / DAT) : 6 GB (minimum) Removable Bulk Storage Media for above : 10 nos Monitor : Minimum 19" Full Flat TFT Resolution 1600 x 1280, refresh rate min 85 Hz. Software : a General MS Windows latest version, MS-Office, Microsoft Visual Studio, Adobe Acrobat, anti-virus McAfee or equivalent, etc. b Application software - to suit project specific requirement
12	Laptop along with Fire Alarm Panel Commissioning Software License /Dongle	The screen size of the laptops should be 15 – 17 inches. All the Laptop will also be used as pluggable temporary programmer's station and operator station functionalities of the programming stations mentioned in the specifications shall be provided (including requisite license).
13	Furniture for Operator Workstation &	Required furniture for mounting of HMI peripherals shall be provided. Chairs: Industry standard revolving chairs with wheels and with provision for adjustment of height (hydraulically/gas lift) shall be provided for the operators,

ESP-001- 2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION		Std. / Doc. Number	
				PY 56394	
				Rev. No.	00
				Sheet 7 of 12	

	Printer	unit-in-charge & other personnel in control room area. These shall be designed for sitting for long duration such that these are comfortable for the back. Chair pedestal shall be made of 5mm thick MS plate covered with poly-propylene cladding. Arm-rests in one piece shall be of poly-urethane and twin wheel castor of glass filled nylon. The exact details shall be finalized & approved by Employer during detailed engineering. Tables -- Industry standard tables
14	Mini-UPS for Operator Workstation & Printer (To be sized by bidder)	Online Interactive UPS with 30 mins. battery backup on machine load (for PC & its printer)

8. POWER SUPPLY

- 8.1 Purchaser shall provide the power supplies as per scope markings indicated in Annexure-[D] of this specification. Further conditioning & distribution within Fire Alarm Panels & HMIs shall be in bidder scope. Bidder to consider Power supply unit with battery along with spike arrester cum distribution board for extending power supply to PC (CPU, Monitor), Printer and FAPs.
- 8.2 Vendor shall supply accessories (like cable glands, plugs, etc.) required for termination of purchaser's as well as vendor power & control cables at vendor supplied equipment.
- 8.3 Vendor shall furnish above feeders' capacity during order execution with calculations.
- 8.4 All internal distributions shall be designed such that a single power fault in any instrument branch system shall not cause a trip of the entire system. Each consumer shall be provided with separate switch & isolation fuse.

9. EARTHING

- 9.1 Each system earthing shall be carried in-line with industry standard practices. Scheme for recommended earthing system/earth pit shall be furnished by vendor during order execution for approval.
- 9.2 Earth points of all panels shall be looped together and shall be terminated at BHEL's earth raisers at single point provided at control room floor.
- 9.3 All hardware with in package required for earthing & connectivity up to BHEL's earth points shall be in vendor scope.

10. BIDDER'S SCOPE OF SERVICES

- 10.1 Supervision of erection & commissioning, performance guarantee testing & trial run and final handing over to end customer for the supplied systems.
- 10.2 Number of man days and number of visits as specified in the "Annexure-[B] of this specification" shall be considered. However, either or both of the number of man days or no of visits may increase / decrease based on the actual site requirement.
- 10.3 Bidder to mobilize concerned competent person for supervision of Erection & commissioning activities within a period of 7 days of receipt of intimation in this regard from BHEL.
- 10.4 Following shall be the scope of work for services:
- 10.5 Services charges shall include the travel to & fro travel from vendors work to site, lodging, boarding & local travel. Vendors shall arrange their own lodging, boarding & traveling.
- 10.6 Vendors shall arrange their own Test equipment's, commissioning tools, manpower etc as required.
- 10.7 Above services shall be ordered by BHEL Site at the time of commissioning. However vendor shall submit the price offer for services as per "Annexure-[B] of this specification" and same shall be considered for L1 evaluation.

ESP-001- 2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION		Std. / Doc. Number	
				PY 56394	
				Rev. No.	00
				Sheet 8 of 12	

11. MANDATORY SPARES

Spares requirement shall be as per enquiry & “Annexure-[A] of this specification”.

12. ERECTION & COMMISSIONING SPARES

- 12.1 All commissioning spares as required during erection and commissioning of all the systems are included in bidder's scope & shall be supplied along with the main supply/package.
- 12.2 Bidder to ensure that all the spares are procured from the original equipment manufacturers (as per their recommendation) and shall make them available at site well before the start of commissioning activities.

13. TRAINING

- 13.1 Bidder shall arrange training for Owner's personnel. Different type of courses shall be offered for operation / process engineers and operators, instrument maintenance engineers and technician.
- 13.2 Travel and living expenses of the owner's personnel shall be borne by the Owner. Apart from the hardware and software maintenance training and site training, bidder shall also offer operation training basically meant for operating personnel.
- 13.3 The various facilities available in the system for operation, actions required during emergencies and identifying the various diagnostic messages shall be the main contents of the operation training.
- 13.4 The duration & location of the training shall be as per “Annexure-[A] of this specification”.

14. DOCUMENTATION

14.1 Information to be included with offer

- a. Vendor shall make the offer in detail, with respect to every item of the Purchaser's specifications. Any offer not conforming to this shall be summarily rejected.
- b. Duly filled & Signed copy of Check list
- c. Deviation list, if any (as per “No deviation format” given in this specification).
- d. Unpriced price schedule (To be submitted compulsorily without fail)

14.2 Documentation after P.O. Placement

- a. Submission of documents as per “Master documents schedule” (which will be finalized in Kick-off meeting after award of the contract) within 2 weeks of placement of LOI (for approval by BHEL and / or BHEL's customer in 4 sets)
- b. Further BHEL will provide comments on vendor submitted document within 15 working days for revision & resubmission. Vendor shall follow up with BHEL for non-receipt of comments/approvals.
- c. Revised drawings / Documents shall be submitted by Bidder in 07 days of receipt of comments / observations from BHEL. BHEL shall revert within 15 days on receipt of these revised documents / drawings from vendor for approvals.
- d. All the approvals required for manufacturing shall be completed with 2 months from P.O to meet the P.O delivery schedule. Accordingly, vendor shall ensure the submission of approval category documents (which are required for manufacturing) and obtain their approvals.
- e. Vendor shall obtain final approvals on all technical and quality aspect documents before inspection dates.
- f. It is vendor's responsibility to obtain approvals from BHEL as earliest as possible to meet PO delivery schedules. Accordingly, vendor to plan and execute the supplies in time.

14.3 Documents to be submitted during final shop testing and before equipment dispatch.

(Note: submission of these documents are commercially linked) - all in 16 sets (2 sets to be included with item dispatch and balance to BHEL purchase department).

- a. Complete O& M manual.

ESP-001- 2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION		Std. / Doc. Number	
				PY 56394	
				Rev. No.	00
				Sheet 9 of 12	

- b. Approved Engg documents
- c. As-Shipped documents
- d. As-Built documents
- e. Guarantee and all test certificates for review and acceptance by BHEL and / or BHEL's Customer
- f. 3 sets of CD-ROM – containing O&M manual and Engineering documents (1 set to be included with item dispatch and balance to BHEL purchase department).

15. MARKING, PACKING AND DESPATCH

- 15.1 All items shall be marked (stamped/etched) in accordance with the applicable code/standard/specification. In addition, the item code, if available, shall also be marked.
- 15.2 For ease of identification, the color of painted strip (wherever required) shall be as per the applicable standard.
- 15.3 Part number/Dispatch link-up of all the equipments/items supplied and also their co-relation with system/drawing/approved BOQ.
- 15.4 Paint or ink for marking shall not contain any harmful metal or metal salts which can cause corrosive attack either ordinarily or in service. Special items/smaller items shall have attached corrosion resistant tag providing salient features.
- 15.5 The equipment shall be transported to site by the vendor in fully assembled condition. However, in case some components are liable to be damaged during transit, the same shall be dismantled and supplied separately, to be reassembled at site the vendor. Assembly of the item supplied loose at site and repairing of any item damaged during transport shall be in the vendor's scope. The vendor shall send each consignment to site with a detailed packing list.
- 15.6 All the equipment shall be divided into several sections for protection and ease of handling during transportation. The equipment shall be properly packed for transportation by ship/rail or trailer. The equipment shall be wrapped in polythene sheets before being placed in crates/cases to prevent damage to the finish. Crates/cases shall have skid bottom for handling.
- 15.7 Special notations such as 'Fragile', 'This side up', 'Center of gravity', 'Weight', 'Owner's particulars', 'PO Nos.' etc. shall be clearly marked on the package together with other details as per purchaser order.
- 15.8 The equipment/items may be stored outdoors for long periods before installation. The packing shall be completely suitable for outdoor storage in areas with heavy rains/high ambient temperature, unless otherwise agreed.
- 15.9 The following minimum packing procedures shall be followed:-
 - a. All items shall be dry, clean and free from moisture, dirt and loose foreign material of all kinds.
 - b. All items shall be protected from rust, corrosion, and mechanical damage during transportation and handling.
 - c. Each variety and size of item shall be supplied in separate packaging marked with the purchase order no., item code (if available), and the salient specifications.
 - d. All electrical, instrumentation etc, shall be properly packed to prevent damage during transport, storage, handling at site.
 - e. All the items which the Bidders considered liable to be damaged during shipment or storage, shall be packaged for separate shipment. If instruments are removed from the panel, they and their connection shall be suitably tagged to ensure simple re installation at the job site. Each instrument shall be sealed in plastic bags containing moisture absorbing dessicants.
 - f. It shall be bidder's sole responsibility to protect all the material during period of dispatch, storage and erection against corrosion, incidental damage due to vermin, sunlight, rain, high temperature, humid atmosphere, rough handling in transit and including delays in transit.
 - g. Mandatory Spare parts shall be packaged separately and clearly marked as 'Mandatory Spares'.
 - h. Commissioning spares, Tools & tackles to be packed separately & suitably tagged.

ESP-001- 2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION		Std. / Doc. Number	
				PY 56394	
				Rev. No.	00
				Sheet 10 of 12	

16. TESTING, INSTALLATION, COMMISSIONING & ACCEPTANCE

Following major items, Final Inspection including document verification as per approved QAP shall be carried out by CUSTOMER /CONSULTANT/ CUSTOMER's Third Inspection Agency & BHEL/BHEL's Third Party Inspection Agency at vendor works. Rest of the items shall be by BHEL/BHEL's Third Party Inspection Agency:

S.No	Item	Inspection by
1	Fire Alarm panels & Detectors	CUSTOMER /CONSULTANT/ CUSTOMER's Third Inspection Agency & BHEL/BHEL's Third Party Inspection Agency
2	All other items	BHEL/BHEL's Third Party Inspection Agency

17. SYSTEM INTEGRATION TEST (SIT)

- 17.1 The Fire alarm equipment including various sub units shall be completely wired and interconnected for the purpose of integrated tests.
- 17.2 Fire and fault alarm conditions shall be simulated on each line and channel and the complete operational sequence shall be checked. The channels shall be tested for their capability for various detector combinations and types of detectors.
- 17.3 The following tests shall be simulated, including any other test as required:
- Single Fire Alarm, Multiple alarms in single loop & multiple loops
 - Single fault and Multiple faults (Earth fault, open circuit and short circuit fault)
 - Multiple alarms & Multiple faults
 - System diagnostic tests
 - System response time, time taken for sound mute/ acknowledge & reset actions at various locations etc. shall be checked.

18. ACCEPTANCE CRITERION:

- 18.1 The reliable operation of the supplied FAS has to be demonstrated after testing and commissioning by conducting a test run of the entire system for one week (24x7), during which no failure of the system shall occur.
- 18.2 The final acceptance of the system will be based on on-field testing of the devices as well as the complete system. Code conformances shall be demonstrated in the acceptance tests. The service check of the system shall be done for 15 days. The equipment will be considered as commissioned after 15 days of uninterrupted successful operation.
- 18.3 After complete handing over, System Architecture Drawings, as built drawings for all building, technical catalogues & literatures, O & M manual, checklist & recommendation from manufacturers, acceptance Reports, pre-commissioning test reports in soft (in CDs) & hard (printed) form shall be submitted by vendor.

19. WARRANTY:

- 19.1 Warranty shall be valid for 48 months commencing from date of commissioning or 60 months from the date of supply whichever is earlier.
- 19.2 Free upgrades to new versions and introductory training for the new version of the software and programming software shall be provided free of cost during the warranty period.

20. VENDOR LIST

- 20.1 Project specific vendor list is shall be as per "Annexure-[G] of this specification". Bidder to follow the same.
- 20.2 If sub-vendor list not available for any specific item, bidder shall be follow NTPC approved vendors by producing the previous executed references / NTPC approvals.

ESP-001- 2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION		Std. / Doc. Number	
				PY 56394	
				Rev. No.	00
				Sheet 11 of 12	

21. DEVIATION FORMAT

Enquiry No.:

Item:

Name of Bidder:

Offer Ref. No.:

Sl. No.	Clause no. & Spec. no.	Description as per Specification	Deviation taken	Nature of Deviation	Remarks

NOTES:

1. Technical offer of the bidder will be evaluated only on the basis of Deviation Schedule. Deviation Schedule constitutes this sheet (with these Notes) duly signed and stamped.
2. Deviations, if any, shall be clearly brought out only in this format. Deviations mentioned / taken elsewhere or in any other format will be ignored.
3. Additional sheets in the same format can be attached by the vendor, if necessary.
4. Nature of Deviations shall only be of Design / Manufacturing constraints and non-availability of items / components / makes in market.
5. No price implications shall be entertained for deviations withdrawn during the technical scrutiny. If any deviations are accepted by BHEL during technical scrutiny then also there will be no price implication. Hence, in no case there will be consideration of Price implications.
6. Reasons for the deviations shall be specified in the Remarks column.
7. If there are no deviations from the specifications, bidder still has to submit the signed copy of this format by writing "NO Deviations" on this format.
8. If the "Deviation Schedule" is not submitted along with the offer, the bidder's offer is likely to be rejected without any further interaction with the bidder. Only the accepted deviations in conjunction with the original tender shall constitute the contract document for the award of job to the bidder

SIGNATURE OF THE BIDDER_____

NAME_____

DESIGNATION_____

COMPANY SEAL

DATE_____



PROJECT ENGINEERING & SYSTEMS DIVISION

Std. / Doc. Number

PY 56394

Rev. No.	00
----------	----

Sheet 12 of 12

[illegible]