

TD-201 Rev No. 00	Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	PY 56217 REV 00 Page 1 of 12
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Technical Specification for Fire Detection & Alarm System + Optical LHS System + PLC System

Project: 4X270 MW Bhadradri TPS
 Customer: TSGENCO -HYD
 Consultant: Desein Consulting Engineers,Hyd

INDEX

SL No.	DESCRIPTION	Page No.	SL No.	DESCRIPTION	Total Pages
1.	Title	1	11	Annexure-A1: BOM	7
2.	Scope, PTR, Instructions, Standards.	2	12	Annexure-A2: Panel wise BOM	16
3.	Scope Matrix for supply , Engg. Installation	3	13	Annexure-B: Plot Plan drawing	1
4.	Technical specification, Power supply	4	14	Annexure-C: Zones marked for air sampling detectors	2
5.	Technical specification of Optical LHS	4-5	15	Annexure-D: FDA Schematic Diagram (Dwg. No. : 1-383-16-00177)	2
6.	Power Supply	5	16	Annexure-E: Technical spec for FDA (Contract Document)	135
7.	Earthing; Bidder's Scope Of Services	6	17	Annexure-F: DBR	30
8.	Mandatory Spares; Erection & commissioning Spares; Training Documentation; Marking, Packing And Dispatch	7	18	Annexure-G: Drive Control Philosophy	13
9.	Testing, Installation, Commissioning & Acceptance Warranty; Sub Vendor List	8-9	19	Annexure-H: Cable Gallery and coal conveyor drawing for Optical LHS requirements.	14 no. of documents
10.	Datasheets formats & information	9	20	Annexure-I: Master Document List	4
	Check List	10	21	Annexure-J: PLC Configuration Diagram	1
	Deviation Format	11	22	Annexure-K: Unpriced price bid Format	7

DOCUMENT TO BE SUBMITTED ALONG WITH TECHNICAL OFFER (To be filled, signed, stamped and scanned copy to be submitted as a part of technical offer):

Sl. No.	Document Name	Page No's	Remarks
1.	Technical Specification(PY56217)	1-11	
2.	Unpriced price format	Annexure-K	"Quoted" to be written under price part
3.	Proposed system architecture for FDA, OLHS, & PLC systems.	Vendors Document	
4.	Major components along with their Make & Model	Vendors Document	

Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD					PY 56217																																																																																																															
							REV. 00																																																																																																															
							Page 3 of 12																																																																																																															
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However, bidder shall do system commissioning. 3) Engineering of Panels, Loop cards, model selections, configuration of software's, etc. are part of Bidder scope. 4) Any special activities involved in erection like FO cable splicing, termination, etc. shall be by bidder. 5) PLC I/O List, Signal grouping, Logic diagrams & inputs for graphics shall be provided by BHEL after P.O. placement. 6) For Optical LHS cable+controllers requirements, BHEL will provide layout documents only. Further, detailed BOQ, routing, looping and other accessories required for the system to taken care by bidder only. 6. Technical specifications: <table border="1"> <thead> <tr> <th>S. 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Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD		PY 56217																																					
				REV. 00																																					
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		3	I/O Count (During detailed engineering IO's may shuffle in any of the panel, maintaining the same IO count)	:	<table border="1"> <thead> <tr> <th rowspan="2">S. No.</th> <th rowspan="2">System</th> <th colspan="4">No. of I/O's</th> </tr> <tr> <th>Analog Input</th> <th>Analog Output</th> <th>Digital Input</th> <th>Digital Output</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>FPS PLC</td> <td>20</td> <td>8</td> <td>144</td> <td>40</td> </tr> <tr> <td>2</td> <td>Remote IO-1 (Foam pump house)</td> <td>2</td> <td>1</td> <td>11</td> <td>4</td> </tr> <tr> <td>3</td> <td>Remote IO-2 (Booster Pump House)</td> <td>3</td> <td>3</td> <td>24</td> <td>6</td> </tr> <tr> <td>4</td> <td>Interposing Relays</td> <td>NA</td> <td>NA</td> <td>NA</td> <td>Applicable for DO's</td> </tr> </tbody> </table>			S. No.	System	No. of I/O's				Analog Input	Analog Output	Digital Input	Digital Output	1	FPS PLC	20	8	144	40	2	Remote IO-1 (Foam pump house)	2	1	11	4	3	Remote IO-2 (Booster Pump House)	3	3	24	6	4	Interposing Relays	NA	NA	NA	Applicable for DO's
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4	System Loading	:	1) Loading for the controller shall not exceed 60% with installed spares 2) The system memory shall have sufficient capacity for 30% additional application programming & configuration in future.																																						
5	System Redundancy	:	1) Controller – 1:1 2) Communication Bus/cards – 1:1 3) Power supply – 1:1																																						
6	Installed Spares	:	1) For I/O cards : 10% of base quantity in Table-(A) 2) For system cards : 10% of total quantity to meet project requirement mentioned in Table-(B) 3) Marshalling: 10% [this includes isolators, terminals, cable glands, etc.] 4) Power supply: 20% for each variety [like feeders & other sub-components] All the installed spares shall be supplied with fully wired up.																																						
7	Other technical requirements	:	1) Refer Annexure-[A2] & [I] of this specification 2) Software Licenses shall be valid for lifetime. 3) Factory Acceptance Test (BHEL + VENDOR + DESEIN + BHEL TPI + End user) at Vendor works 4) Site Acceptance Test (BHEL + VENDOR + DESEIN + BHEL TPI+ End user)																																						
Ref. Doc		7. Technical particulars for Optical LHS: Detection System by Optical Linear Heat Sensing Cable a) Linear Heat sensing cable shall be non-electrically operated optical fibre type. b) The detector system shall consist of an optical fibre sensor and the detection unit. The detector unit shall house the electronic circuitry that interfaces with the optical fiber sensor. c) The optical fibre shall be connected to the detector unit in a single continuous loop to ensure redundancy and full Coverage of the protected zones even if the cable is broken/cut/damage at one point. d) The fire or excessive temperature condition shall be sensed by the fibre. The detector unit shall recognize the Change in optical transmittance of the fiber and cable breaker Fire/Alarm condition shall be identified within 1 meter locational accuracy. e) Bidder to consider suitable no of relay output contacts Approximate No of zones in coal conveyor area & in cable gallery area as per input drawings. f) Installation of optical linear heat sensing cable in gallery and conveyor area shall be as per TAC guidelines.																																							
		8. Installation Guidelines for Optical LHS LHS system is to be designed & supplied to cover the entire cable galleries and coal conveyor areas of the power plant. Corresponding drawings of cable galleries & conveyors are made available in Annexure- H of this specification. Following installation guidelines to be followed for estimation & supply of LHS system.																																							

Form No.	बी एच ई एल  HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	PY 56217
			REV. 00
			Page 5 of 12

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8.1 CABLE GALLERIES:

I. Each cable tray shall be protected by LHS cable unless the vertical distance between the trays is uniformly less than 500 mm in which case alternate trays (in addition to the top and bottom trays) shall be protected.

II. The LSHS cable shall be laid on the cables at the center Line of the cable-runs either straight along the cables or zigzag and back and forth across the ladder and trays.

III. It is also possible to suspend the LHS cables below the trays so as to be within 200 mm of the cable-runs at a pitch of 1.2 M like a catenary.

IV. Where the width of the tray exceeds 1M, two LHS cables shall be laid on the trays as above. Alternatively, cables maybe laid in a zigzag fashion in which case pitch of the zigzag profile shall not exceed 1.2 mtrs.
It is always necessary to install two LSHS cables below the lower most tray because accumulation of filth, rubbish and waste in such areas is a possible rendering them fire-prone.

V. Approval of the Committee must be obtained before commencing the installation for their specific requirements. Necessary support shall be extended by the bidder in obtaining such approvals.

8.2 BELT CONVEYORS:

I. The following fire situations are considered for the protection of the conveyors with LSHS cables.

a) Stationery conveyor, b) Moving conveyor, c) Belt Roller friction, d) Belt friction with adjoining portions of the structures, e) Spill of fuel, lubricants and the like on the return belt).

The LHS cables can be considered for detection of any one combination of two or more of the situations described above.

II. The method of mounting the LHS cables under the above circumstances depends upon convenience Mounting as well as the vulnerability of the LSHS cables.

The LHS cables shall be mounted as close to the Risks mentioned above as possible i.e. on both sides of the belt rollers, or above the material carrying belt on separate supports or combination of both depending on the circumstances.

III Approval of the Committee shall be obtained before commencing the installation for their specific requirements if any. Necessary support shall be extended by the bidder in obtaining such approvals.

IV Heat sensing cable, as detector shall be used for coal conveyor gallery including bearings and both drive pulley and non-drive pulley, transfer points. Linear heat sensing cable shall be provided along the whole length of the top belt and bottom belt of each conveyor and on bearing and pulley of driving and non-driving ends (in a zig-zag fashion).

9. Power supply:

9.1 Purchaser shall provide the power supplies as per FDA schematic diagram provided elsewhere in this specification. Further conditioning & distribution within Fire alarm Panels, LHS system & 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, FAPs & LHS system.

9.2 Vendor shall provide standalone PDB (if required) for PLC system with necessary protections & metering for powering equipment's under their scope. Power distribution scheme shall be approved by purchaser.

9.3 Vendor shall supply accessories (like cable glands, plugs, ferrules,etc.) required for termination of purchaser's as well as vendor power & control cables at vendor supplied equipment's.

9.4 Vendor shall furnish above feeders capacity during order execution with calculations.

9.5 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.

10. Earthing

10.1 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.

10.2 Earth points of all panels (located in a single building) shall be looped together and shall be terminated at BHEL's earth raisers at single point provided for each building. However separate earth wiring shall be provided for PLC package & all other systems.

Ref. Doc

Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	PY 56217																																																										
			REV. 00																																																										
			Page 6 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.	10.3 All hardware with in package required for earthing & connectivity up to BHEL's earth points shall be in vendor scope.																																																												
	11. Bidder's Scope Of Services 11.1 Scope includes Supervision of erection & commissioning, performance guarantee testing & trial run and final handing over to end customer for the supplied systems. 11.2 Number of man-days and number of visits as specified in the <u>"Unpriced price bid format"</u> 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 requirements for which unit rates shall be operated. 11.3 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. 11.4 Following shall be the scope of work for services: a) Vendor services includes supervision of erection & commissioning, performance guarantee testing & trial run and final handing over to end customer for the supplied systems. Further the scope involves lodging, boarding & local travel conveyances. Vendors shall arrange their own lodging, boarding & traveling. b) Vendor visit charges includes travel to & fro travel from vendors work to site, c) Vendors shall arrange their own Test equipment's, commissioning tools, manpower etc as required. 11.5 Above services shall be ordered by BHEL Site at the time of commissioning. However, vendor shall submit the price offer for services as per <u>"Unpriced price bid format"</u> and same shall be considered for L1 evaluation. 11.6 Broad scope marking of supervision of Erection & Commissioning between bidder & purchaser is as listed below:																																																												
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12. Mandatory Spares - Spares requirement shall be as per enquiry & <u>"Mandatory spares list"</u> "provided elsewhere in this specification. All mandatory items shall be packed separately in "RED" color boxes.																																																													
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Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	PY 56217
			REV. 00
			Page 7 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.	13.1 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. 13.2 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. 14. Training 14.1 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. 14.2 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. 14.3 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. 14.4 The duration & location of the training shall be as per “<u>Unpriced price format</u>”. However these prices will not be considered for L1 evaluation. 15. Documentation- As per master document list (MDL) 16. Marking, Packing And Dispatch 16.1 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. 16.2 For ease of identification, the color of painted strip (wherever required) shall be as per the applicable standard. 16.3 Part number/Dispatch link-up of all the equipments/items supplied and also their co-relation with system/drawing/approved BOQ. 16.4 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. 16.5 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. 16.6 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. 16.7 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. 16.8 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. 16.9 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 desiccants.		
	Ref. Doc		

Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	PY 56217																																																																			
			REV. 00																																																																			
			Page 8 of 12																																																																			
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Rest of the items shall be by BHEL/BHEL's Third Party Inspection Agency: <table border="1"> <thead> <tr> <th>S.No.</th> <th>Item</th> <th>Inspection by</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Optical LHS System</td> <td>CUSTOMER /CONSULTANT/ CUSTOMER's Third Inspection Agency & BHEL/BHEL's Third Party Inspection Agency</td> </tr> <tr> <td>2</td> <td>Fire Alarm panels & Detectors</td> <td>CUSTOMER /CONSULTANT/ CUSTOMER's Third Inspection Agency & BHEL/BHEL's Third Party Inspection Agency</td> </tr> <tr> <td>3</td> <td>PLC panels</td> <td>CUSTOMER /CONSULTANT/ CUSTOMER's Third Inspection Agency & BHEL/BHEL's Third Party Inspection Agency</td> </tr> <tr> <td>4</td> <td>All other items</td> <td>BHEL/BHEL's Third Party Inspection Agency</td> </tr> </tbody> </table> 18. Warranty The warranty shall be valid for 12 months commencing from date of commissioning or 18 months from the date of supply whichever is earlier. 19. Sub Vendor List 19.1 The list of sub-vendors are given below for major items/equipment. 19.2 Supply items for which no definite "make/brand" is indicated, shall be procured only from reputed makes & models having proven track records and requires purchaser approval. 19.3 Further the supplied model of FAP, Repeater panel, Detectors, Devices, Modules etc. shall be under regular manufacturing range and have proven track record. <table border="1"> <thead> <tr> <th>S NO.</th> <th>Item Description</th> <th>Suggested make</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Optical LHS system</td> <td>AP Sensing / Patol / Protect wire</td> <td></td> </tr> <tr> <td>2</td> <td>PLC System</td> <td>ROCKWELL Automation India Pvt Ltd / GE Intelligent Platforms Pvt Ltd / Siemens India Pvt Ltd / Schneider Electric India Pvt Ltd / Honeywell Automation India Ltd</td> <td></td> </tr> <tr> <td>3</td> <td>UPS</td> <td>Emerson network power (Pune) Pvt. 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Form No.	बी एच ई एल  HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD		PY 56217
				REV. 00
				Page 9 of 12

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	14	Terminal Blocks & accessories, side clamp , Din Rail channel & Stopper (Indoor)	Connect well Industries Pvt Ltd / Elmex Control Pvt Ltd / Industrial Controls / Oshiv Engineers	
	15	MCB / MCCB / Timer	SIEMENS LTD.,	
	16	MCB	Legrand, Mumbai / CGL Mumbai / Alstom Bangalore / L&T Mumbai / Siemens Mumbai / Schneider Electric / Siemens AG /Siemens (I) Ltd / GE Power / ABB / Havells	
	17	Annunciators	Pradeep Mumbai / Minilec marketing Pvt Ltd, Pune / Proton Chennai / IIC Mumbai	
	18	Cable lugs / sockets	Dowells, Mumbai	
	19	AC distribution Board / DC Distribution Board	Emerson Network power, Thane / Hitachi-Hirel Power electronics, Gandhinagar / Amararaja Power systems Ltd, Tirupati / HBL Power systems, Hyderabad / Chhabi Electricals, Jalgaon.	
	20	Alarm Annunciation System	Instrumentation Ltd, Kota/ Procon Chennai	
	21	Cable lugs	Braco Electricals (India) Pvt Ltd / Commet brass poroducts / Dowells / Baliga Lighting Eqpt.	
	22	PC's	HP	
	23	Panel meters	Automatic Electric Pvt Ltd / Mecro Instruments / Rishab	
	24	Indicating Lamps	ABB(I) Ltd / Essen & Deiniki / GE power controls / Siemens	
	25	Auxiliary relay	Jyothi Ltd, Baroda	
	26	HRC fuses with trip indicator, Fuse base isolator	Fuse Gear / GE power controls Ltd / Siemens India	
	27	Computer furniture	Cosmos Media Products Pvt Ltd, Udaipur / Godrej and Boyce manufacturing Co Ltd, Bangalore / Pyrotech Workspace Solutions Pvt Ltd, Udaipur	
	28	Printer (Laser /inkjet)	EPSON (inkjet only) / IBM / DELL	
	29	TFT monitor	IBM-LENOVO / SAMSUNG	
	30	Mini UPS for HMI	Hitachi-Hirel Power Electronics, Bangalore / Emerson Network India, Bangalore	
	31	GIU	Rockwell Automation India Pvt Ltd	
	32	Station LAN equipment	IBM India Pvt Ltd / Texonic Instruments, Bangalore / Wipro Infotech, Bangalore	
	33	OFC (Optical Fibre cable)	HFCL-Goa / FINOLEX, Pune/Goa / D-Link	
	34	Batteries	Amar Raja Batteries, Tirupati / HBL Nife Power systems Ltd / Exide Industries Ltd	
	35	Cable glands, lugs, ferrules , Tying wires	Electromac Industries, Mumbai / Mahaveer Engg, Kolkata / Braco Electricals (india) Pvt Ltd / Lapp India (P) Ltd.	
	36	MCCB	L&T / CGL / GE-Power / Siemens / Schneider / ABB / Havells	
	37	Interposing Relays	Jyoti / ABB / Siemens / Alstom / Howeywell / OMRON	
	38	Relays (Other than Interposing relays)	ABb / Alstom / Siemens / GE-power (multilin) / Mitsubishi	
	39	Fuse Base	GE-Power / L&T / Alstom ltd/ Siemens / C&S Electric / ABB / CGL	
	40	Fuses	GE-Power / L&T / Alstom ltd/Siemens / Schneider / ABB / Havells / CGL	
	41	Terminal block (fixed drawout)	Phoenix / Connect well / Elemex / Wago	
	42			

Ref. Doc

20. Check List (To be filled by BIDDER and submitted along with Technical offer compulsorily)

Vendor shall submit the following documents mandatorily as part of COMPLETE technical offer.

Enquiry No. / Date :

Name of the Bidder :

Project Name :

Item Description :

S. 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, <u>no commercial implications can be claimed by the bidder</u>		
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		

Ref. Doc

(Bidder's Signature and stamp with date)

Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	PY 56217
			REV. 00
			Page 11 of 12

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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. **Clause deleted.**
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

COMPANY SEAL

SIGNATURE OF THE BIDDER_____

NAME_____

DESIGNATION_____

DATE_____

Ref. Doc

[illegible]