

	Bill of material [for Main Supply]		Annexure -[A] of PY 56394	
	Fire Detection & Alarm System		Rev 00	
	Project: 3 x 800MW Patratu			
BHEL MATERIAL CODE: PY9756394005				
S. No.	Item Description	Quantity [A]	Unit	Remarks
1	Fire Alarm Panel (Each panel shall have 12 Loops)	14	No.'s	Location of Panels: a) ESP-1 b) ESP-2 c) ESP-3 d) Raw Water Pump House e) Hydrogen Generation Plant f) CCR-1 g) CCR-2 h) CCR-3 i) Admin j) FWPH k) AHP MCC-5 l) CHP MCC-2 m) CHP MCC-4 n) Service Building
2	Repeater Panel	1	No.'s	Location: Fire Station
3	Multisensor Detectors with detector base and mounting back box (analogue addressable)	6000	No.'s	
4	Heat Detectors with detector base and mounting back box (analogue addressable)	165	No.'s	
5	Analogue addressable Probe Detectors (ROR type) with Flameproof Junction box (Min. 50 ft x 50 ft coverage for each detector along with counter flange and gasket)	15	No.'s	If addressable detector is not available in offered make, then Module (1 Input + 1 Output) with IP-65 enclosure to be provided along with detector.
6	Analogue addressable Beam Detectors	20	No.'s	If addressable detector is not available in offered make, then Module (1 Input + 1 Output) with IP-65 enclosure to be provided along with detector.
7	Analogue addressable IR Ember Detectors with local control unit, Air Purge Unit & accessories	44	No.'s	If addressable detector is not available in offered make, then Module (1 Input + 1 Output) with IP-65 enclosure to be provided along with detector.
8	Indoor Manual Call Points with mounting back box [Analog Addressable type]	350	No.'s	
9	Outdoor Manual call points with mounting back box (IP-65 min.) [Analog Addressable type]	235	No.'s	
10	Flameproof Manual call points with mounting back box [Analog Addressable type]	10	No.'s	If addressable MCP (Flameproof) is not available in offered make, then Module (1 Input + 1 Output) with flameproof enclosure to be provided along with detector.
11	Indoor Hooter cum Strobe with mounting back box [Analog Addressable type]	355	No.'s	If addressable Hooter cum strobe is not available in offered make, then Module (1 Input + 1 Output) with IP-65 enclosure to be provided along with detector.
12	Exit Sign (Self illuminating)	355	No.'s	
13	Response Indicators	1360	No.'s	
14	Siren (3 km) with Siren Control panel	1	No.'s	415 V, 3-Phase Operated Siren and 230V, 1-Phase Operated Siren Control Panel
15	Interface module for Siren Operation with IP-65 enclosure	1	No.'s	
16	Digital LHS Cable for Cable Galleries	50,200	Meter	
17	Digital LHS Cable for Coal Conveyors	40,000	Meter	
18	Digital LHS Controllers (2 km range)	1	Lot	Refer Note-12 below
19	End of Line Resistance with Terminal Box	315	No.'s	
20	Cable Junction Box for 2P x 2.5 sqmm MICC Cable	50	No.'s	
21	LHS Cable Jointing Box	91	No.'s	
22	Module for LHS Cable (1 Input + 1 Output) with IP-65 enclosure	315	No.'s	

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23	Module for Deluge Valve (2 Input + 1 Output) with IP-65 enclosure	275	No.'s		
24	Module for Limit Switches (2 Input + 1 Output) with IP-65 enclosure	275	No.'s		
25	Module for Tripping (1 Input + 1 Output)	50	No.'s		
26	Module for Monitoring Pumps Status (1 Input + 1 Output) with IP-65 enclosure	12	No.'s		
27	Module for Interface with FAP of Stacker (1 Input + 1 Output) with IP-65 enclosure	12	No.'s		
28	Module for Interface with DCS (1 Input + 1 Output) with IP-65 enclosure	10	No.'s		
29	Module for Interface with IGES (1 Input + 1 Output) with IP-65 enclosure	12	No.'s		
30	24 V DC Power Supply Modules with Battery Back Up	10	No.'s	5A, 24V DC with battery backup of 30 min.	
31	Operator Workstation & A4 size color laser Printer along with Graphic software i.e., (GUI) Software	6	No.'s		
32	Laptop along with Fire Alarm Panel Commissioning Software License /Dongle	1	No.'s	Handing over of license shall be don after commissioning of complete system	
33	Furniture for Operator Workstation & Printer	6	Sets		
34	Mini-UPS for Operator Workstation & Printer (To be sized by bidder)	6	No.'s		
35	8 core Armoured single mode Optical Fiber Cable with 2" rodent proof HDPE conduits (for fire alarm panels and PC networking)	15500	Meter	Refer Note-10, 11 below & Item sl no 1 for panel locations	
36	Erection & Termination hardware for Optical Fibre cables	1	Lot	For BOQ refer item Slno 35 and Note-10, 11	
37	All hardware & Software required (including OPC Licenses etc.) required for establishing the networking between all fire alarm panels, repeater panels, DCS, PCs, Printers etc shall be considered.	1	Lot		
38	Cable Tags for 1P x 1.5 Sqmm Cable	336	No.'s		
39	Cable Tags for 2C x 2.5 Sqmm Cable	160	No.'s		
40	Cable Saddle + Saddle Bars along with fixing screws and rawl plugs for 1P x 1.5 sqmm Cable	132000	No.'s		
41	Cable Saddle + Saddle Bars along with fixing screws and rawl plugs for 2C x 2.5 sqmm Cable	73400	No.'s		
42	Nylon Cable Tie for 1P x 1.5 sqmm Cable	78800	No.'s		
43	Nylon Cable Tie for 2C x 2.5 sqmm Cable	53400	No.'s		
44	Mounting Accessories & Erection Hardware for all above items	1	Lot	Refer Note-7 below	
Technical Notes:					
1)	Battery sizing of FDA panels is in the scope of bidder. Bidder to considering the panels as fully loaded for sizing purpose. The standby power source (battery bank to power fire detection and alarm system) should be sized for 24 hours of continuous load or 30 minutes in alarm condition (at least 25% devices considered active in alarm condition).				

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2) 3) 4) 5) 6) 7) 8) 9) 10) 11) 12) 13) 14) 15) 16) 17) 18) 19) 20)	Power supply to all the detectors/components specified in the BOQ above, should be extended from the Fire alarm Panels Only. Sizing of powersupply modules, batteries size for secondary power, calculation of notification appliance circuit voltage drops, selection of internal components of FDA Panels etc. to be carried out by bidder & panel model need to be selected accordingly. Battery & Power supply calculation sheet verified by OEM and to be submitted to BHEL during detailed Engg for approval. In case the bidder offered system is having multiple variants of loop cards, bidders are advised to select loop cards which cater to largest distance. Bidder to note that all the above detectors/devices shall be loop powered. In case loop powered devices are not available in the make offered, bidder shall consider the necessary modules as per above BOM. Each addressable loop device (Detectors, MCP, Module etc) shall have inbuilt short circuit isolator suitable for Class A wiring. Fire alarm panels shall be floor mounted only. All erection hardware including back box, fixing screws, lugs, glands, clamps, structural steel, anchor fastner, chains, J-bolts/J-hook, nuts, bolts, flanges etc. for the above items shall be considered in the offer by the bidder. In addition to this, an additional 10% of all erection hardware shall be considered in the scope of bidder.Post order, the vendor need to submit detailed erection document indicating BOQ of erection hardware for each variety of detector/device etc. i.e., Erection hardware for detectors/devices -calculation sheet to be furnished during detailed Engg stage. All interface modules shall be provided with enclosure suitable for outdoor application. Unit rates for addition/deletion (+10% to -20%)for Main and mandatory spares shall be applicable Also necessary erection hardware (jointing kits, termination kits, LIU, patch card, media converter, pit tails, etc) for FO cable shall be considered in the scope bidder. In addition, splicing and termination of FO cable and it's accessories are in bidder scope. Minimum BOM for meeting this requirement is: Splicing tool kit=1 Set, LIU / Media converters=60 No's, Pigtails = 60 No's, Network interface card= 30 No's, bidder to add other items (if any) for completeness of the system. Fire alarm panels, repeater panels specified in the BOM are to be connected in ring topology using fiber optic cable. Quantity of Single Mode Optical Fiber cable (for networking of Fire Alarm Panels, Repeater Panels, Workstations, Printers etc) is indicated in the BOQ In case, bidder offers digital LHS controller of 2-Channels with 2 kms range then the quantity shall be 27 nos. However in case bidder offers digital LHS controller of 1-Channel with 2 kms range then the quantity shall be 45 nos. For Interface / integration of FDA system with DCS redundant OPC Connectivity through FO Cable- necessary hardwares + softwares are to be included in the scope. LIUs (Fiber Patch Panels / Light interface units) - are to be used for routing, terminating and managing optical cable terminations and should be mounted inside the FAPs & Repeater Panel enclosures Please consider alarm Temperature of LHS cable as 60 Deg (min.) for cable galleries and 80 Deg (min.) for coal conveyors. Supply items for which no definite "make/brand" is indicated, shall be procured only from reputed makes & models having proven records of accomplishmet and requires purchaser approval. FAP, Repeater panel, Detectors, Devices, Modules etc. shall be under regular manufacturing range of OEM and have proven track record. Information/Status of all panels shall be available in all the workstations using GUI Software All the network switches shall be of high quality and shall be sized to meet the functional requirements as specified. The common switch to which all networks are connected shall be Layer-III switch/router. 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 derive the BOM for hardware material based on the make and model components selected for main FDA panel. Accordingly, mandatory spares quantities shall be derived / populated based on defintion against mandatory spares sheet . The quantities will be verified during detailed Engg.	

	Bill of material [for Mandatory Spares Supply]		Annexure -[A] of PY 56394
	Fire Detection & Alarm System		Rev 00
	Project: 3 x 800MW Patratu		
BHEL MATERIAL CODE: PY9756394030			
S. No.	Item Description	Quantity [B]	Remarks
1	Multisensor detectors (Addressable) and Photo-electric type detector(Addressable)	5% of total supply	
2	Indicators assembly for smoke detectors provided in false ceiling (Response indicator)	5% of total supply	
3	LHS cable for coal conveyors	5% of total supply	
4	LHS cable for cable galleries	5% of total supply	
5	Manual pull stations or MCP	10% of total supply of each type	
6	Infrared detector unit with local control unit, purging unit, other accessories (for complete replacement)	5% of total supply	
7	Hooter cum Strobe with mounting back box (Indoor) [Addressable type]	1 No	
8	Interface unit/ modules for non addressable devices, auxillary / output relay modules, control modules, monitor modules, supervisory control modules and any other electronic modules	10% or 1 No. of each type and model whichever is more	
9	Spares for Fire alarm panel & repeater panel		
9.1	Fuses	100% of population	
9.2	Indicating Lamps	100% of population	
9.3	Push Buttons	10 Nos of each type and rating	
9.4	Power supply Modules	10% or 1 Nos of each type and rating whichever is more	
9.5	Control modules, loop cards modules, isolator cards , auxiliary / output relay modules, control modules, supervisory control modules and any other electronic modules	10% or 1 No. of each type whichever is more.	
9.6	LCD display of each type unit of panel	1 No	
9.7	Catridge for Printers	2 Nos	
9.8	LED's of each type	100% of population	
9.9	Power Supervision relay	4 Nos of each type	
9.1	Fire screen/Alarm buzzer	1 No of each type	
10	Pre fabricated cables of each type	1 No. of each type, Size and model	
11	Pre fabricated cable connectors	1 No. of each type and model	
12	Other cables (including core cable, short term fire proof cable, fibre optic cables, etc.)	5% of each type, pair/ core and size of actual installed quantity.	
13	24V – DC POWER SUPPLY SYSTEM		
13.1	CTs, CVTs, VTs, chokes, AC/DC isolators, contactors, timers, relays	5% or 2 Nos. of each type and rating whichever is more.	
13.2	Fuses of each type and rating	200	
13.3	Fuse free Circuit breakers	5% or 5 Nos. of each type and rating whichever is more.	
13.4	Electronic modules of all types	One No. of each type	
13.5	Indication lamps	1	
13.6	Cooling Fans	1 No. of each type	
13.7	Indicators	1 No of each type and rating	
13.8	Relays of all types including overload relays	2 Nos. of each type and rating	
13.9	Batteries	5% or 2 nos. of each type & rating whichever is more	