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TECHNICAL SPECIFICATION
FOR
INERT GAS EXTINGUISHING SYSTEM

PROJECT	: ROURKELA PP-II EXPANSION PROJECT (1X250 MW)
CUSTOMER	: NTPC-SAIL POWER COMPANY (P) LIMITED
CONSULTANT	: MECON LTD , RANCHI

		Revisions :	Prepared by:	Checked by:	Approved By:	Date
			-SD-	-SD-	-SD-	06/07/2017
		00	D V Prashant Kumar	P Chandrasekhar	MNSR	

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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.		1. INTENT OF SPECIFICATION: The intent of this document is to establish the minimum requirement of design, engineering, supply, selection, selection, manufacture, assembly, inspection, shop testing, shop painting, transportation and delivery at Manuguru site in proper condition and supervision of Erection & Commissioning at site for the Inert Gas Extinguishing System, which forms part of the project. The equipment and supply shall conform to high standard of engineering and applicable codes/standards and shall be capable of performing intended operation in a manner acceptable to the Purchaser and end customer 2. SPECIAL NOTES TO BIDDERS 2.1. This specification shall be read in conjunction with all its annexures listed later in this specification. In case of any discrepancy arising between this specification & its annexures, the most stringent of all (as determined by purchaser) shall be followed. Further, if a requirement in this specification or any of the annexures, calls for a decision from the Purchaser, it shall be bidder's sole responsibility to clearly bring out/highlight the same distinctively in his pre-bid queries, so as to enable purchaser to furnish their decision/clarification. If such issues/requirements are not duly addressed by bidder during the pre-bid stage and if such issues/requirements are observed later during order execution stage, it shall be binding on the bidder to comply with the final decision made by the purchaser subsequently, without any cost, delivery, or any other commercial implications. 2.2. All materials supplied under this contract shall be new and unused. 2.3. All equipment/items as applicable, shall be UL/FM/VDS/LPCB approved. 2.4. Any additional equipment, material, services etc., which are not specifically mentioned in this specification, but required to make the IGES complete in all respects, in accordance with the intent of this technical specification, contractual agreement, statutory requirements, relevant/applicable codes/standards, good engineering practices, and for safe and trouble-free operation, shall be deemed to be covered under the scope of this specification. 2.5. All mounting hardware/ accessories/fittings etc. required for the erection of Inert gas Extinguishing System shall be included in the scope of bidder and the same shall be included in the base price even if such items are not explicitly mentioned in this specification. 2.6. The Bidder shall accept full responsibility for the completeness and for the faultless working of all the equipments and the IGES system as a whole.		
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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.	2.7. Bidder to note that the Purchase Order for the entire IGES system for the project shall be placed on lump sum fixed prices based as per tender specification requirements. 2.8. Bidder offer shall be strictly as per these specification requirements. Unsolicited or Alternate offers from the bidders will not be entertained. 2.9. In case bidder feels that it is necessary to exclude some components of scope of supply or some of the features of specification requirements due to any technical constraints, bidder shall bring the same to the notice of purchaser during pre-bid stage and take their prior approval before submission of their bid. Format for pre-bid queries is attached to this specifications. 2.10. The design information, specifications and drawings indicate the "Minimum" requirements and are intended to enable Bidders to ascertain the extent of the work involved. Bidders are expected to supplement the information included in this specification as required and submit a comprehensive bid. 2.11. Bidder to refer to the Special Conditions of the contract (SCC) & General Conditions of the Contract (GCC) of tender specifications. 3. PROJECT DESCRIPTION <table border="1"> <tr> <td>1</td> <td>Owner</td> <td>NTPC-SAIL Power Company (P) Limited</td> </tr> <tr> <td>2</td> <td>Project</td> <td>Rourkela PP-II Expansion Project (1x250 Mw)</td> </tr> <tr> <td>3</td> <td>Location</td> <td>Rourkela, Odisha</td> </tr> <tr> <td>4</td> <td>Latitude & Longitude</td> <td>22°13'19" N; 84°53'51"</td> </tr> <tr> <td>5</td> <td>Consultant</td> <td>Mecon Ltd, Ranchi</td> </tr> <tr> <td>6</td> <td>Nearest Airport</td> <td>Ranchi</td> </tr> </table> 4. PRE QUALIFICATION CRITERIA Bidder shall note and comply with the pre-qualification criteria mentioned in Annexure-18. Bidder shall provide the information along with supporting documents. 5. GENERAL SYSTEM REQUIREMENT 5.1. IGES system shall be designed to operate as and when required in 24 hours per day and 365 days in a year. 5.2. The life span to be considered in the design, equipment and component selection shall be a minimum of 20 years.			1	Owner	NTPC-SAIL Power Company (P) Limited	2	Project	Rourkela PP-II Expansion Project (1x250 Mw)	3	Location	Rourkela, Odisha	4	Latitude & Longitude	22°13'19" N; 84°53'51"	5	Consultant	Mecon Ltd, Ranchi	6	Nearest Airport	Ranchi
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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.		5.3. For the design of the plant, it is necessary not only to consider the requirements of operation, but also, by suitably planning the layout, the convenience of inspection, cleaning, maintenance and repair. 5.4. In order to achieve the reliability, high efficiency and safe operation of the plant, it is also necessary to consider various precautions to safeguard the operating and maintenance personnel. 5.5. The design of the plant shall ensure that the plant can adapt itself to load, pressure (in the state of normal operation) with primary parameter variation within the allowable range of design. 5.6. After award of work, before finalizing especially the layout/Zones of system, pipe routes and other services, the bidder shall carry out a site survey to identify the location & details of existing facilities that may interfere with his proposed facilities. He shall suitably modify his layout/levels to prevent dislocation of existing facilities without any commercial implication to the purchaser. 5.7. The dimensions of the cylinder room (20m x 5m) for each inert gas extinguishing system is already finalized and cannot be changed now. Bidder to select the system (as per NFPA-2001 guidelines) to which while meeting the intended requirement as per the specification and shall be properly housed in the inert gas cylinder room. Adequate space for Operation & Maintenance of cylinder shall also be considered while selecting the inert gas system. 5.8. If during the execution of works it is found that there is interference with other facilities / structures, the Bidder shall revise his design/detailed drawings to clear the interference and shall provide all necessary measures for the safety of structures under construction. No claim in terms of cost or relaxation in time shall be entertained for any redesign, rework and for the safety measures provided. If at any stage of work, any dismantling or modification or relocation of any facilities is required to be done to complete the work in bidder's scope and which has been agreed by the Purchaser, the same shall be done by the bidder at no extra cost or time implication to the Purchaser. All such changes will be executed only after the proposed drawings and work plan are approved by the purchaser. 5.9. The Bidder shall take all necessary precautions to protect all the existing equipment, structures, facilities and buildings etc. from damage. In case any damage occurs due to the activities of the Bidder on account of negligence, ignorance, accidental or any other reason whatsoever, the damage shall be immediately made good by the Bidder at his own cost to the satisfaction of the purchaser. 5.10. The Bidder shall also take all necessary safety measures at his own cost, to avoid any harm or injury to his workers and staff from the equipment and facilities of the power station.		
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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.		➤ IS: 2419-1979 -Dimensions for Panel mounted indicating & recording electrical instruments (first revision) (with Amendment No.1.) ➤ IS:8573-1977 -Digital electronic DC voltmeters and DC electronic analogue-to-digital convertors(with Amendment No.1) (Reaffirmed1991) ➤ ANSI B 16.5 - Pipe flanges and flanged fittings. ➤ SMPV rules , PESO Nagpur (For Storage Cylinders) ➤ Clean Agent Manufacturer’s recommendations ➤ VDE: 0150, protection against corrosion due to stray currents from DC installations. ➤ Statutory Requirements i. Requirements of the following local statutory authorities (as applicable) shall be taken into account for compliance: a. Tariff Advisory Committee (TAC) Guidelines (for Insurance purposes) b. VDE : 0150, protection against corrosion due to stray currents from DC installations. c. DIN : 30676 d. Requirement of Petroleum & Explosives Safety Organization (PESO), Nagpur, India. ii. Latest edition of applicable codes/Standards/Statutory Regulations referred to in the Bid Document shall correspond to the edition as on the date of issue of bid. iii. All addenda including the latest addenda to all the above codes and standards (latest editions) shall be followed by the bidder. iv. All the legal formalities including preparation of documents, furnishing clarifications, information etc. as and when required, for obtaining any of the permissions and approvals related to the IGES will have to be done by the bidder. Note: Bidder to follow all other applicable statutory rules and regulations of India during manufacturing, procurement & transportation of the IGES components. 7. BIDDER’S SCOPE OF SUPPLY		
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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.	The Inert Gas Extinguishing System (IGES) of this project shall cover the following areas which are included in bidder's scope of supply and supervision of erection & commissioning: - Central Equipment Room (CER) - Unit Control room, C&I Engg. room, Shift, Shift Incharge room & Computer room Computer room Following is the scope of supply required for protection of the above mentioned areas: 7.1. One (01) Inert Gas Release Panel. 7.2. 1 lot of Inert Gas Cylinders required for the system along with same no. of standby cylinders. Including solenoid valves, directional valves, pilot manifold etc. and shall be FM/UL/Vds/LPCB approved. 7.3. 1 Lot of Piping & fittings, pressure gauges, nozzles, threadolets, weldolets, socketolets & all other equipment/accessories required for completion of system. 7.4. One lot of Cables including interface cables with Fire Alarm panel , Conduit and related erection hardware. The input drawings are furnished along with the specification. The same may be used for estimation of cables. However, for quoting purpose bidder to consider a cable distance of 100 mtrs between Gas Release panel and Fire Alarm panel. 7.5. One lot of Inert gas Discharge Warning Signs 7.6. One lot of gas discharge EPB & inhibitor unit 7.7. One lot of Pressure Operated Switches 7.8. One lot of Pressure Relief Vents 7.9. First Fill of consumables 7.10. Erection & Commissioning spares 7.11. One lot of erection hardware 7.12. Special tools & tackles 7.13. Mandatory spares 7.14. Items like Trolleys, etc required for Refilling & Maintenance of Inert Gas cylinders.		
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	Sl. No.	Description	Quantity															
1.	Multimeter	1 no.																
2.	Hand drilling machine with complete set drill bit	1 set																
3.	Hammer	1 no.																
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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.	<table border="1"> <tr> <td>5.</td> <td>Instrument Box</td> <td>1 no.</td> </tr> <tr> <td>6.</td> <td>Insulation Pliers</td> <td>1 no.</td> </tr> <tr> <td>7.</td> <td>Nose Pliers</td> <td>1 no.</td> </tr> <tr> <td>8.</td> <td>Screw Driver</td> <td>1 no.</td> </tr> <tr> <td>9.</td> <td>First Aid Box</td> <td>1 no.</td> </tr> </table> Any other tools required for repairs and maintenance but not mentioned above shall be supplied by the bidder. ii. All special tools and tackles which are necessary or convenient for erection and commissioning of the Inert Gas Extinguishing System shall be supplied at site by bidder. Price of these items shall be construed to be included in the main package price. No separate price for the same shall be offered iii. All the special tools and tackles shall be shipped in separate heavily constructed wooden boxes. Notes: 1. All Tools and tackles required for dismantling, maintenance, adjustment, and calibration of the all the equipments that form part of Inert Gas Extinguishing System shall be supplied. 2. Bidder shall provide all equipment like trolleys, etc. required for Refilling & Maintenance of Inert Gas cylinders. 3. Bidder to note that if at a later stage the requirement of any other special tool & tackles is required for the Package, same has to be supplied by bidder without any delivery or commercial implication. Decision of the Purchaser regarding the requirement of any additional tools and tackles will be final and binding on the Purchaser. 4. All special tools and tackles shall be handed over purchaser, prior to the issuance of the PROVISIONAL ACCEPTANCE CERTIFICATE for the IGES. 9. BIDDER'S SCOPE OF SERVICES 9.1. Supervision of erection & commissioning a) Supervision of erection, commissioning & performance testing at site for the supplied system shall be included in bidder's scope of service. b) Bidder to note that the supervision charges for erection & commissioning shall consists of the following: • Per day supervision charges of an Engineer including all other expenses like boarding, lodging, local travel, insurance etc.				5.	Instrument Box	1 no.	6.	Insulation Pliers	1 no.	7.	Nose Pliers	1 no.	8.	Screw Driver	1 no.	9.	First Aid Box	1 no.
	5.	Instrument Box	1 no.																
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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.		15) Material Reconciliation 16) Material re-conciliation will be done jointly by Purchaser's erection office & Sub-vendor. Bidder to note that the payment towards the supply for any item will be made only after the completion of the material reconciliation activity at site. 17) Bidder to further note that no separate payment shall be made by Purchaser for material reconciliation activity (material reconciliation at site will not be considered as a part of supervision of E&C activity) & any price of this service will be deemed to be included in the basic price of supply of the package quoted by the bidder. 18) Mechanical Completion 19) Preparation of startup and operating manuals 20) Pre-commissioning activities and rectification 21) Commissioning and reliability run. 22) Running of the IGES System as per Purchaser / End customer's requirements till final handing over. 23) Successful Performance guarantee testing 24) Handing over the IGES to the owner 25) Coordination and statutory approval from government/non-government bodies/agencies 26) Supply of all test reports /certificates 27) Providing as built drawings 28) Training of the Clients Engineering and Operating Personnel NOTE: Bidder to note that the above list is not exhaustive and any other service required as per the intent of this specification / project requirements /good engineering practice shall be deemed to be included in bidder's scope without any commercial implication to the purchaser 9.2. Documentation for TAC Approval and TAC approval for Inert Gas Extinguishing system a) All activities related to TAC approval like preparation of documents, furnishing clarifications, information etc. as and when required, till final approval is obtained, shall be in bidder's scope. b) All comments, modifications etc. suggested by the TAC / TAC accredited agency shall have to be incorporated by the bidder without any extra cost to the purchaser. c) Bidder shall be responsible for getting the approval for the fire protection system from concerned authorities for insurance meeting any additional requirement as demanded by such authorities without any extra cost.		
Ref. Doc		9.3. Training To End Customer:		

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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.		a) Prior to handing over of the system to Owner, the supplier shall provide operational training to Owner's operating personnel, which shall consist of control system operation, troubleshooting procedures, emergency procedures, safety requirements etc. b) The duration of the training shall be for a minimum of three working days for five personnel. 9.4. After award of work, before finalizing his layout especially the layout/levels of equipments cable/pipe routes and other services, the bidder shall carry out a site survey to identify the location & details of existing facilities that may interfere with his proposed facilities. He shall suitably modify his layout/levels to prevent dislocation of existing facilities without any commercial implication to the purchaser. 9.5. Arrange for services of manufacturer's installation / commissioning engineer at site during mechanical completion / pre-commissioning & commissioning of all the major equipment and systems is included in bidder's scope. All the cost including that towards boarding, lodging, servicing, Insurance, Local Travel, Service charges etc. for arranging all the above visits shall be deemed to be included in the bidder's quoted price. Bidder shall not be eligible to raise any extra claim in this regard. 9.6. Bidder is also required to provide on the job training to Purchaser /End Customer's operation personnel by associating them in all the day to day pre-commissioning, commissioning and maintenance activities and process operations, however, responsibility for adequate manning the system shall be that of bidder. The cost of all such training shall be deemed to be included in the price quoted by the bidder. Bidder shall not be eligible to raise any extra claim in this regard. 10. Design of IGES system: 10.1. General i. Complete design and all the system components/equipment or major system components (as applicable for approving/listing agencies) shall be approved and listed by UL/FM/VdS/LPCB and shall also be approved by TAC/TAC accredited professional(s) before installation. ii. The IGES shall be a total flooding centralized system with directional valves and have 100% standby cylinders. iii. Total flooding Clean Agent System shall be provided by inert gas only.		
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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.		iv. The system shall be centralized for all the rooms protected, and shall be designed as total flooding for the single largest room volume (ceiling void + room void + floor void) of control room. The areas to be protected by inert gas extinguishing system shall be divided into the following zones (refer Annexure-10) each: ➤ Central Equipment Room (CER) ➤ Unit Control room, C&I Engg. room, Shift, Shift Incharge room & Computer room v. The clean agent piping and nozzles shall have to planned clearing following facilities coming on its route , in the areas where protection is being envisaged: • The beam and ribs which criss-cross the ceiling • Path of AC ducts • Cabling in false flooring • Light fitting, detectors etc. vi. System design, specifications, working plans, flow calculations etc. shall be prepared in line with NFPA-2001 or as specified by listing authorities and shall be approved by Owner. vii. IGES system shall be interconnected with FDA system of the plant. 10.1.1. Design Concentration, Quantity & Discharge Time: i. Minimum design concentration of INERT gas fire extinguishing system shall be as per NFPA-2001. However higher concentration may be used, if it is specified by the agent manufacturer/system supplier (OEM) for the area protected. ii. Bidder shall design the system to meet the minimum requirements of Clean Agent System as per NFPA-2001 and having design concentration as specified at 70⁰ F (21⁰ C) for the single largest risk zone to be protected. iii. The complete volume of the rooms including the above false ceiling and below false flooring shall be considered for estimation of quantity of gas and containers. iv. When determining the gas quantity, the minor leakage losses through window and door opening have been considered however it is necessary that all the opening should be minimised in order to retain concentration of Inergen agent for 10 minutes after discharge to prevent reflash/reignition for effective extinguishment. v. Further volume of re-circulating type air conditioning system & its duct work (at least upto the automatic fire dampers of the ducts) shall be considered as a part of the total volume so that the design concentration is achieved throughout the hazard area. Further gas quantity will be adjusted for ambient pressure & temperature conditions.		
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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.		vi. To provide primary supply of gas & its cylinders, along with 100% (one hundred percent) standby/reserve gas quantity and cylinders for single largest hazard being protected (as per NFPA 2001). vii. The discharge time period shall be such that 95% of the minimum design concentration for flame extinguishment based on 35% safety factor(Class-C hazard) is achieved within 120 seconds. The flow calculations shall establish this criterion. viii. The quality of gas shall conform to relevant design standard such as NFPA-2001 or as specified by listing authorities. ix. Calculation shall be provided by the designer to prove that the area is not pressurised and extinguishing capability is not affected due to provided ventilation of that area. Pressure vent shall be provided for each protected area as per system requirement. 10.1.2. System Flow Calculation: i. System flow calculation shall be performed using a calculation method listed or approved by the authority having jurisdiction (i.e. UL/FM/Vds/LPCB) and shall be approved by TAC accredited agency. The system design shall be within the manufacturers listed limitations. ii. Approval certificate of software from UL/FM/Vds/LPCB etc. shall be submitted along with the offer. iii. Bidder shall also provide sufficient measures (like properly designed louvers etc.) facilities in the risk areas to dissipate over pressurisation due to release of Clean Agent and also provide calculation in support of same for each protected area. 10.1.3. Clean Agent Quantity: i. Minimum design concentration of Clean Agent gas shall be as per CI no 5.4.2 of NFPA-2001 at 70 deg F by volume for clean agent fire extinguishing system based on approved/listed flow calculation method. ii. Clean agent concentration requirement shall be computed considering the volume of the hazard as specified. In addition to the concentration requirement as specified, 20% of the gas quantity as computed above , shall be added to compensate for leakages and extinguishing efficiency. The bidder, as per NFPA-2001, shall work out the quantity of clean agent. However, bidder drawing shall quote minimum quantity of agent for volume as given in the scope. 10.1.4. The principle of operation shall be as follows :		
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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.		i. Whenever there is a fire in any of the rooms protected, the same will be detected by the automatic fire detector. It will in turn annunciate a fire signal in the MFAP. The first detection signal will actuate the hooters in the room and warning lights, so as to warn the people to evacuate and prevent people from entering the room. When, at least another automatic fire detector in the room registers a fire condition, the necessary fire dampers in the AC / Ventilation system will get closed (from their respective panel/s based upon confirmed fire signal from the MFAP), the clean agent extinguishing system will get actuated and the time delay for the release starts (normally 10 seconds however shall be based on the recommendation of the bidder). After the time delay elapses, the clean agent is released. The release mechanism operates by opening the electrical actuator of the pilot cylinder, which then in turn open the quick opening valve of the designated slave cylinders, and thus releasing the gas in the manifold. The gas then is carried through piping to the room in fire and released through the nozzles located strategically in the room. The gas is maintained in the room for a specified period of time (about 10 min. however shall be based on the recommendation of the bidder), during which the fire is extinguished. ii. In case, it gets known during the time delay period before release, that there is no fire but the alarm is false alarm, the gas release can be aborted by pressing the abort switch. Also, if due to any reason it is found that the gas is not getting released even after the time delay period, a manual release can be initiated by pressing the manual release button. iii. The system shall be designed based on the single largest risk area of the control room to be protected. However, the grouping of cylinders shall be made in such a way that discharge takes place corresponding to the volume of the risk under fire. iv. The system shall include electrically actuated automatic Clean Agent Fire Extinguishing System complete with filled up Clean Agent cylinders cylinder rack, manifolds, Pressure reducing devices, cylinder valves, pipes, discharge nozzles, bracket support, hangers, and such other fittings as necessary for complete installation of the system required to install the system. v. The system shall also comprise of the different modes of operation, actuation and cancellation facility etc. with necessary local control panel mentioned elsewhere in this specification. vi. Operating devices and Local control panels shall be provided for this system. The bidder shall have to offer 100% Clean Agent filled standby cylinders. (i.e. A reserve clean agent filled cylinders with manifold , directional valves and automatic change over to any of the two banks after actuation of main cylinders to be provided in each risk area i.e. 100% reserve).		
Ref. Doc		10.1.5. Modes of System Operation:		

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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.		i. The system shall comprise of the following mode of operation and actuation and cancellation facility etc. with necessary control panel: System operation shall be possible by the following means: - Automatically due to fire detection in protected area - Operation of manual release push button located adjacent to protected area. - By operating manual lever provided on electrical/manual control head on pilot cylinder - By push button actuation at Clean Agent Control panel , in manual mode ii. The clean agent shall be discharged /actuated automatically after an adjustable time delay based on the detection signal received. The delay shall be minimum 30 sec.; however it shall be adjustable from 30 to 120 sec. In the local control panel of clean agent system, there shall be one hooter, which shall operate once the gas is released. During time delay, there shall be a pre-discharge alarm (audio+visual). Hooter shall follow the alarm once the gas is discharged. 10.1.6. Clean Agent Gas & Its Grouping/Distribution: i. The quantity of clean agent gas provided shall be sufficient to protect the single largest risk with 100% standby. The system for every individual risk shall have its own distribution piping, nozzles, alarms and actuation system etc. ii. Suitable combination of cylinders shall be made to cater to all the risk areas individually. iii. Both primary and standby cylinders shall be permanently connected to distribution piping through manifold and arranged for easy and automatic changeover. Suitable selector switches be provided for "Normal/ Standby" supply selection. iv. Since the system is designed for the largest risk and there are several risk areas varying in size in a particular building, the system shall permit the use of required no of cylinders for any individual risk involved so that the concentration of gas in that risk area does not exceed the NOAEL as per NFPA-2001. 10.1.7. Gas properties and its discharge characteristics: i. Physical properties of Inert gas agent shall meet the requirements in table A-1-4.1 (a) and (b) respectively, of NFPA-2001. Properties of Agents used as Fire Extinguishing Agents (Shall be as per NFPA-2001 latest edition) ii. The agent container pressure shall be as recommended in NFPA 2001.		
	Ref. Doc	iii. The agent discharge shall be substantially completed in a nominal 120 sec.		

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Ref. Doc		11.10. Testing		

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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.		14. MARKING, PACKING AND DISPATCH 14.1. Marking i. 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. ii. For ease of identification, the color of painted strip (wherever required) shall be as per the applicable standard. iii. 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. 14.2. Packing i. Bidder shall ensure proper packing of IGES equipment before dispatching. All items shall be dry, clean and free from moisture, dirt and loose foreign material of all kinds. ii. IGES system shall be supplied in packaging marked with the purchase order no., item code (if available), and the salient specifications. iii. Special notations such as 'Fragile', 'This side up', 'Center of gravity', 'Weight', 'Owner's particulars', 'PO Nos.' etc. if required shall be clearly marked on the package together with other details as per purchaser order. iv. The equipment 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. v. Prior to shipment components of the unit shall be completely cleaned. All the componenets of the system shall be properly packed to prevent damage during transit damage, loading, unloading and storage. vi. Spare parts if applicable shall be packaged separately and clearly marked as 'Spare Parts'. 14.3. Dispatch i. Inert Gas Extinguishing system shall be properly packed for transportation by ship/rail or trailer.		
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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.		ii. Bidder shall obtain clearance from BHEL for dispatch of all the IGES components. Bidder must make request for dispatch clearance to BHEL in advance before the expiry of delivery date of P.O. iii. No claims of bidder will be accepted, on account of delay in requisition for dispatch clearance. iv. Prior permission from BHEL shall be taken before dispatch of any of the item having shelf life. Bidder to note that any eventual delay on account of this will not be attributable to them. v. The mandatory spares shall be treated and packed for long storage (minimum five years) under the climatic conditions prevailing at the site. Mandatory spares should be supplied separately with green colour painted box. vi. A separate document indicating the details of all the items having SHELF LIFE shall be furnished. Prior permission from BHEL shall be taken before dispatch of any of the item having shelf life. A packing list covering items having shelf life are to be intimated to site. Also, shelf life items shall be packed separately in black color painted box for easy identification at site. vii. Loose vendor items sent to sites shall be quantified/numbered/tagged and not merely mentioned as ONE lot of loose items. 15. DOCUMENTATION 15.1. Bidder shall submit the list of documents as mentioned in Annexure-2 as per the schedule mentioned. 15.2. Bidder to note that the dates of submission of all the documents shall be finalized by him considering the time required for approval of various documents at Purchaser's end. It shall be solely bidder's responsibility to get approval on the entire document from purchaser to meet project schedule. 15.3. Drawings / Documents Review And Approvals i. The bidder's documentation shall be in accordance with this specification, codes/standards and good engineering practices. The discrepancies/deviations found in documentation of bidder shall be implemented by bidder without commercial implications.		
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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.		ii. Any delay on the part of bidder's documentation shall be to bidder's account only. iii. All the dimensions should be in S.I. units. iv. All documents before forwarding to Purchaser will have to be vetted in detail by bidder. Document received without vetting will be returned without review. Also any inaccuracies/mistakes found will not only be rectified by the bidder but the bidder shall remain liable for bearing charges towards efforts spent by Purchaser for discussing the same. Delay owing to these shall be to the account of bidder v. The bidder shall thoroughly review and submit the documents before forwarding to Purchaser vi. Only the approved drawings duly stamped and signed by a competent engineer of bidder shall be submitted to purchaser for review. vii. Documents submitted without meeting pre-requisite requirements will be returned without review. viii. Review of drawings and documents issued by bidder shall be carried out by Purchaser /End customer. ix. Approval/ review of the drawings/ documents by the Purchaser /End customer would be only limited to the review of compatibility with basic designs and concepts. x. The approval and /or review by the Purchaser /End customer shall not be construed by the bidder as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications and drawings. xi. The Bidder shall be responsible for and shall pay for any alterations of the Work to be accrued out by other agencies due to any discrepancies, errors or omissions in the Drawings or other Particulars supplied by him whether such drawings or particulars have been approved by the Purchaser/ End customer or not. xii. Revisions in drawings/documents shall be clearly marked within clouds. No revision without clouding shall be recognized and the same shall not be considered reviewed and approved. All revised drawings / documents shall be associated with comments compliance report. xiii. First submission of the drawings / documents shall be made by bidder within 30 days from P.O placement.		
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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.		xiv. Normally the first submission of drawings / documents shall be reviewed by the purchaser with 14 calendar days of receipt of drawing at Purchaser's end. 14 days shall be reckoned from the date of receiving hard/soft copy of the documents at purchaser's center. xv. All revised drawings / Documents shall be submitted by Bidder in 07 days of receipt of comments / observations from BHEL. BHEL shall revert within 07 days on receipt of these revised documents / drawings from Bidder. xvi. Engineering shall be considered completed once all documents mentioned in Document list (Annexure-2) are submitted and applicable approvals are obtained from BHEL. 15.4. Document Submission Procedure i. All Drawings/Datasheet etc. shall be submitted in soft as well as hard copy. Soft submission of all drawings/data sheets is mandatory. ii. First submission of the set of documents shall be submitted within 30 calendar days of LOI/ PO. iii. Bidder shall furnish all documents in A4 Size (210 mm x 297 mm) paper or folded in A4 size unless otherwise specified. All drawings and sketches shall be in multiples of A4 size like A3 (297 mm x 420 mm) or A2 (420 mm x 594 mm) etc., but folded to 'A4' size. iv. It has been observed that at times mails fails to deliver because of problem in sender's /receiver's server .Hence it is recommended that bidder shall intimate concerned BHEL personal about any soft copy submission over phone immediately after any drawing / document is submitted for BHEL's review / approval. v. Final documentation shall be submitted in bound volumes and softcopy shall be furnished in non - writable CD. vi. Bidder shall submit 6 sets of hard copies of final approved drawings & two sets of hard copies of first submission drawings. vii. Hard copies of all the documents shall be forwarded to the following address: Name: (Name will be intimated during awarding of the contract) Address: Bharat Heavy Electrical Limited Administrative Building Purchase dept., PESD RC Puram Hyderabad- 32		
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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.		viii. Date of receipt of hard copies shall be considered as date of submission of any document. Soft copy submission shall be considered as advance submission of drawing/document ix. BHEL shall furnish Approval/Observation of Drawings/Datasheet/Design calculation etc. in Soft Copy only. 15.5. Data Sheets Bidder shall provide data sheets of all Inert Gas System components in line with the specifications. 15.6. Erection & Commissioning Documentation 15.6.1. Erection documentation i. Erection document List shall be prepared during Engineering review meeting (after award of contract) identifying all the DOCUMENTS / DRAWINGS required for completion of Erection activities of the complete system, to be submitted by the bidder as part of documentation. ii. The Bidder shall submit for Purchaser's approval draft manual for Equipment Delivery and Erection (EDE Manual) covering detailed instructions, write up, technical data, drawings, check-lists, documentation formats for all activities after equipment manufacture upto installation of equipment. This manual shall cover general instructions for all equipment and specific instructions for individual equipment wherever required and shall include at least the following : • Instructions for packing, shipping, receiving, handling, ware-housing and storage. • Part number/Dispatch link-up of all the equipments/items supplied and also their co-relation with system/drawing/approved BOQ. • Instructions for location and installation of equipment furnished by this specification. • Installation drawings for field mounted equipment, panels, cubicles and other equipment covered under this specification. • Instruction relating installation of piping/ tubing, support and routing drawings of impulse pipes/signal tubes and tube/cable trays. • Check lists and quality assurance hold points. • Formats for all related documentation. • The EDE Manual shall conform to the requirements of this specification, all applicable codes and standards, recommendations of equipment manufacturers and accepted good engineering practices and shall be subject to Employer approval during detailed engineering.		
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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.		• The Bidder shall ensure that all work under this part shall be performed as per the requirements of this specification, Employer approved EDE Manual and drawing/documents approved by the Employer during detailed engg. 15.6.2. Erection Manuals i. The erection manuals shall be submitted at least three (3) months prior to the commencement of erection activities of particular equipment/system. The erection manual should contain the following as a minimum. • Erection strategy. • Sequence of erection. • Erection instructions. • Critical checks and permissible deviation/tolerances. • List of tool, tackles, heavy equipments like cranes, dozers, etc. • Bill of Materials • Procedure for erection. • General safety procedures to be followed during erection/installation. • Procedure for initial checking after erection. • Procedure for testing and acceptance norms. • Procedure / Check list for pre-commissioning activities. • Safety precautions to be followed in erection all equipments and electrical supply distribution during erection ii. Bidder shall provide sufficient written instructions, including a cross-reference list of all drawings for correctly installing the equipment and prepare the equipment for start-up. iii. It shall include any special information required for proper installation that is not on the drawings, special alignment or grouting procedures, utility specifications (including quantity) and all installation data. iv. It shall also contain the following information: • Instructions for erecting, piping, aligning (including the expected thermally induced shaft centerline shift between normal site ambient temperature position and that at normal equipment operating temperature). • A description of rigging procedures, including the lifting of the assembled equipment, and methods of disassembly, repair, adjustment, inspection and reassembly of the equipment and auxiliaries. • Pre-commissioning/commissioning/functional test procedures and acceptance criterion.		
Ref. Doc		15.6.3. Commissioning documentation		

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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.		i. The contractor shall submit the commissioning documentation, comprising of Standard checklists, pre-commissioning procedures, testing schedules, commissioning schedules and commissioning networks for various Equipment / systems covered under the contract, for the approval of employer. ii. Standard checklist, as the name suggests, shall be a fairly general documents, containing the list of all checks required to be carried out for similar and repetitive type of equipment to ensure consistent and thorough checking. iii. The testing schedule is a document, designed for safe and systematic commissioning of individual equipment/sub-system. Commissioning schedule is a document envisaged for commissioning of a system. The testing/Commissioning schedule shall have a standard format in order to maintain consistency of presentation, content and reporting. A brief write up on the contents of the Testing Schedule/Commissioning Schedule is as per the following: iv. Testing Schedules should be designed to ensure that the plant area, equipment or apparatus are tested and commissioned and will operate as per the employer's specifications and good engineering practices. v. Testing Schedule/Commissioning Schedule is required to be of a standard format in order to maintain consistency of presentation, content and reporting. vi. Testing Schedule/Commissioning Schedule should contain the following sections to make the document a self contained one: • Plant Details/Design data • Testing Objective/Proposals • State of the Plant required prior to commissioning • Erection Status with respect to Mech. Elect and C&I • Services required • Safety requirements • Test method including completion/acceptance criteria • Results • Testing Programme • Mech/Elect/C&I –Plant item completing list • List of Drawing/documents required for carrying out the testing. vii. The contractor shall submit the list of commissioning documentation to be submitted by him, alongwith their submission schedule for various equipment/systems covered under the contract, with in 6 (six) months from the date of award of contract, for the acceptance of employer.		
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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.	viii. The Contractor shall submit the commissioning documentation, for various equipment/covered under the contract, for the approval of employer, at least 12 months before the scheduled date of commissioning of the equipment/systems. ix. Following may be noted wrt the drawing submission schedule: <table border="1"> <thead> <tr> <th>SL NO.</th> <th>DESCRIPTION</th> <th>NUMBER OF COPIES TO BE SUBMITTED</th> <th>WHEN TO SUBMIT</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Initial drawings / documents under approval and information category.</td> <td>2</td> <td>As per approved Master document list</td> </tr> <tr> <td>2.</td> <td>Revised drawings / documents incorporating BHEL's comments.</td> <td>-</td> <td>Within 1 weeks of receipt of commented drawings from BHEL</td> </tr> <tr> <td>3.</td> <td>Final Drawings / documents</td> <td>6</td> <td>Within 2 months of placement of order.</td> </tr> <tr> <td>4.</td> <td>Erection Documentation</td> <td>8</td> <td>1 Month before dispatch of equipment, The list of documents identified under master document list for erection to be furnished in 5 nos. of folders.</td> </tr> <tr> <td>5.</td> <td>Draft O & M Manuals with out test certificates</td> <td>2</td> <td>2 months before the delivery date of equipment</td> </tr> <tr> <td>6.</td> <td>Revised O & M Manuals with Test Certificates to be submitted to BHEL (Hyderabad)</td> <td>8</td> <td>Within one month after dispatch of equipment</td> </tr> <tr> <td>7.</td> <td>Final O&M Manuals in a CD</td> <td>3</td> <td>Within one month after dispatch of equipment</td> </tr> </tbody> </table>			SL NO.	DESCRIPTION	NUMBER OF COPIES TO BE SUBMITTED	WHEN TO SUBMIT	1.	Initial drawings / documents under approval and information category.	2	As per approved Master document list	2.	Revised drawings / documents incorporating BHEL's comments.	-	Within 1 weeks of receipt of commented drawings from BHEL	3.	Final Drawings / documents	6	Within 2 months of placement of order.	4.	Erection Documentation	8	1 Month before dispatch of equipment, The list of documents identified under master document list for erection to be furnished in 5 nos. of folders.	5.	Draft O & M Manuals with out test certificates	2	2 months before the delivery date of equipment	6.	Revised O & M Manuals with Test Certificates to be submitted to BHEL (Hyderabad)	8	Within one month after dispatch of equipment	7.	Final O&M Manuals in a CD	3	Within one month after dispatch of equipment
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Ref. Doc	15.7. Input drawings i. List of inputs as envisaged by purchaser is attached in annexure-8. ii. On receipt of order, it shall be solely the bidder's responsibility to spell out the requirement of the base engineering drawings/documents (required by him over and above the data furnished along with this specification) to go ahead with the																																		

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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.		engineering of the package within a week, and shall not expect the Purchaser to automatically supply the same after order placement – the required base drawings/documents shall be furnished to the Bidder within one week (1 week) of receipt of such requisition from Bidder. Any ultimate delay arising out of the delay by the successful bidder in putting up such a requisition shall solely be to the bidder's account. iii. List of major inputs required for engineering of the system shall be prepared during kick off meeting or 15 days after the award of contract. It is bidder's responsibility to list out all the major inputs required for engineering. After the award of contract, in case there is a delay in supplies, bidder's delivery extension shall be processed based on this inputs list only. Apart from this list any other inputs required will not be considered for delay analysis. iv. Drawings attached with this specification are preliminary in nature & are not exhaustive. These drawings may get revised and /or new drawings will be furnished to bidder during detail engineering .Bidder to however note that they will not be eligible to raise any extra charges on account of this. v. Required drawings/documents shall be furnished to Bidder within 14 days of placement of P.O. vi. Drawings attached with this specification are preliminary in nature & are not exhaustive. These drawings may get revised and /or new drawings will be furnished to bidder during detail engineering .Bidder to however note that they will not be eligible to raise any extra charges on account of this. vii. All relevant input drawings will be made available to the bidder during detail engineering stage as per annexure- 8 of this specification. viii. Bidder to note that they shall not be eligible to raise any extra claim on account of furnishing of new drawings or revised drawings by purchaser during offer execution stage. 15.8. Review meetings & kick off meeting i. As and when required, the bidder will be called upon to attend design co-ordination meeting / review meeting with the end customer/BHEL during the period of the Contract. The Contractor shall attend such meetings at his own cost at venues decided by BHEL. ii. Bidder in his own interest may visit Purchaser's office to expedite the approval of critical drawings, which may affect the progress of project.		
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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.		• 6 bound copies each of the Spare Parts data book and the Lubricants inventory schedule. • 6 complete sets of field records shall be signed by the CONTRACTOR'S and Owner's representatives at the site. • Original approvals and related drawings and documents from the statutory authority. • 3 Copies of correspondence with the statutory authorities. 15.10. Utility Requirements i. This document lists out the following information regarding utilities required by the bidder • List of utilities required i.e. Power (UPS, Non UPS), Instrument air. • Location and estimated/actual requirement at each location. The requirement shall be listed as minimum/normal/maximum. • In case of AC power, the In-rush current with duration and power factor shall also be indicated for each location. 15.11. Operation and Maintenance Manual i. Bidder shall prepare and submit draft maintenance manual to Purchaser for review at least three months prior to the mechanical completion. ii. Final maintenance manual incorporating all comments shall be submitted by bidder within one month after issue of comments. iii. This manual shall provide sufficient written instructions and data to enable purchaser to correctly operate and maintain the equipment ordered. iv. It shall include a section to cover special instructions for operation at extreme environmental and/or extreme operating conditions. v. Maintenance manual shall contain the following chapters as a minimum: • Introduction to the system/unit maintenance • Equipment/facilities register • Location and list of all system/unit equipment. • Equipment record card • Equipment No. and name. • Equipment serial No. and manufacturer details 15.12. Reporting		
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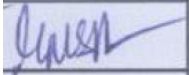
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		has to clearly bring out the same to the notice of BHEL and take their prior approval before submission of bid. Bidders are requested to bring out only those deviations which are impractical to meet (or) not technically advisable as per the experience of bidder, for BHEL's review before the submission of bid. All such clarifications required by the bidder shall be intimated to BHEL together as a single notice within a week of receipt of enquiry by bidder. 16.2 Deviation to specification shall be submitted only in Deviation format (Annexure-9). Deviations mentioned in any other part of the quotation shall NOT be considered. 16.3 In case the bidder considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same along with reasons in a separate section as a part of pre-bid query to enable purchaser take a suitable decision on the requirement of the same. 16.4 Information like Bill of materials (BOM), Instrument list, datasheets, and typical specifications enclosed by the bidder as a part of their bid, shall be retained for information only and shall not be referred by contractor as contractual agreement. No implication shall be admissible on the basis of these documents during any stage of contract execution. 17 SUB VENDOR LIST 17.1 All the equipment shall be sourced from recommended Bidders only as specified Annexure-12. 17.2 Further the supplied model shall be under regular manufacturing range and have Proven Track Record (PTR). (Bidder / sub-Bidder shall have supplied minimum 2 no. in last 7 years, out of which at least one shall be in satisfactory operation for minimum 8000 hours). 17.3 Supply items for which no definite "make/brand" is indicated, shall be procured only from makes & models having proven track records and requires purchaser approval. 17.4 Bidder to comply with sub-vendor list enclosed with the specification. The sub-vendors for any item that is not appearing in the sub-vendor list (annexure-12) may be proposed for BHEL's approval. Non-acceptance of any sub-vendor by BHEL / customer shall not have any commercial & delivery implication. While submitting sub-vendors for approval of BHEL, bidder shall furnish following documents : i. ISO certificate of Sub-vendors ii. Proven track record & references for makes and models supplied earlier.		
Ref. Doc		Note:		

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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.		i. Bidder to note that all IGES equipment such as cylinders, contact gauges, pressure regulators, Gas release Panel etc. shall be UL/FM/LPCB/VdS approved. Cylinders shall also have PESO , Nagpur approval certificate. ii. Bidder shall take prior approval of BHEL w.r.to vendors for procurement of items which are not envisaged in the vendor list. 18 DOCUMENTS ALONG WITH BID The following documents shall be submitted by bidder and the bidder's offer shall be evaluated on the following: ➤ Duly filled & Signed copy of Check list ➤ Deviation list, if any (as per “No deviation format” given in this specification) ➤ Unpriced price schedule (To be submitted compulsorily without fail) Note: Evaluation shall be done on No Deviation schedule. Even if no deviations are there, bidder shall submit, signed copy of No deviation format. Technical evaluation of offer shall be done based on no deviation schedule only. Any other document submitted along with the offer shall be retained for information only. 19 BILLING BREAKUP METHODOLOGY Billing break-up (BBU) shall be submitted to BHEL in following methodology: 19.1 The BBU shall be prepared only for the pro-rata billing purpose. 19.2 Typical BBU for IGES is attached as annexure-6 of this specification. 19.3 BBU will contain complete list of items required for the completion of the project as per specification and shall be dispatched by bidder irrespective of the items/quantities are indicated in the document or not. 19.4 Any additional requirement of the item already indicated in the document will be updated in the subsequent revision of this document. All such item will be dispatched as “free item” term to BHEL. 19.5 Inspection & Testing of all items shall be as per approved quality plan. The entire item shall be dispatched to site only after the completion of Inspection and testing		
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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.		requirement as per approved quality plan. Non-inclusion of any item does not absolve the vendor from meeting the requirement. 19.6 Vendor shall obtain prior permission from BHEL after submitting all the documents before ensuring dispatch of all main items applicable for project. 19.7 Inspection & quality: All the items applicable for this project shall be inspected as per approved quality plan. It may be noted that any item shall be dispatched to site only after complying with the Inspection requirements as per approved quality plan. 19.8 As separate document indicating the details of all the items having SHELF LIFE shall be furnished. Prior permission from BHEL shall be taken before dispatch of any of the item having shelf life. 19.9 Applicable taxes & duties shall be extra. 19.10 BBU shall be a comprehensive document having details of all the items applicable for this project. There should not be any Non-Billable item to be supplied at site. 19.11 BBU shall be submitted as per “Payment Terms of Annexure-BB” 19.12 Wherever Lot items are indicated, same shall be quantified in details in a separate annexure. Similarly all Accessories/ Instruments/ items are to be defined with comprehensive details. 19.13 In case requirement of any such item / additional item is detected at any stage of the contract execution, BBU will be revised to reflect the same. However all the additional items will be supplied as a ‘Zero Value Item’, without any commercial implication to BHEL. All the contractual requirements shall be valid for these additional items also. 20 DEFINITIONS 20.1 BIDDER: Bidder means the party supplying Inert Gas Extinguishing System for this project. 20.2 SUB VENDOR : Sub vendor means any party on whom bidder suborders materials and items (like tubes, forgings etc). 20.3 Quality Assurance Plan (QAP) / Inspection and Test Plan (ITP) It is a document generated by the supplier with complete listing of various inspection stages, tests, material certification requirements and parties involved with their respective roles in inspection; indicating the requirements of Hold (H),Witness (W) Inspection, and Review (R) of Quality control documents / records for an item. QAP and ITP are considered synonymous.		
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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.	20.4 THIRD PARTY INSPECTION AGENCY (TPIA) Third Party Inspection Agency means an inspection agency appointed by the EPCC/LSTK CONTRACTOR for carrying out Inspection and witness of tests of equipment and material being procured by the CONTRACTOR for the Project. 20.5 INSPECTION CATEGORY Inspection category determines the scope of Inspection for the Supplier, TPIA / OWNER for various equipment and material depending upon their use, serviceability, safety criteria and complexity. 20.6 MECHANICAL COMPLETION Mechanical Completion of systems shall mean that all installation works of the system have been completed and hydro tested in accordance with approved construction drawings, approved specification, applicable code as defined in the document, accepted international good engineering practices and all the activities have been completed in a comprehensive manner by the bidder. 20.7 PRE-COMMISSIONING ACTIVITIES Pre commissioning activities, which are required to be performed after completion/ installation, inspection, hydro testing etc. of an equipment/ system to make it ready for commissioning. 21 LIST OF ANNEXURES <table border="1"> <thead> <tr> <th colspan="3">LIST OF ANNEXURES</th> </tr> <tr> <th>Sl. No</th> <th>Drawings/Documents</th> <th>Drg/Doc no</th> </tr> </thead> <tbody> <tr><td>1.</td><td>Price Bid Format</td><td>Annexure – 1</td></tr> <tr><td>2.</td><td>Master Document List</td><td>Annexure – 2</td></tr> <tr><td>3.</td><td>Standard Manufacturing Quality Plan(for reference)</td><td>Annexure – 3</td></tr> <tr><td>4.</td><td>Guidelines for QA QC plan</td><td>Annexure – 4</td></tr> <tr><td>5.</td><td>Format for Despatch details</td><td>Annexure – 5</td></tr> <tr><td>6.</td><td>Typical BBU for IGES system</td><td>Annexure – 6</td></tr> <tr><td>7.</td><td>Pre Bid Query Format</td><td>Annexure – 7</td></tr> <tr><td>8.</td><td>Input Doc. List</td><td>Annexure – 8</td></tr> <tr><td>9.</td><td>Deviation Format</td><td>Annexure – 9</td></tr> <tr><td>10.</td><td>Tender purpose Drawings</td><td>Annexure – 10</td></tr> <tr><td>11.</td><td>Check List</td><td>Annexure-11</td></tr> <tr><td>12.</td><td>Sub-Vendor List</td><td>Annexure-12</td></tr> <tr><td>13.</td><td>Typical BOQ Format</td><td>Annexure-13</td></tr> </tbody> </table>			LIST OF ANNEXURES			Sl. No	Drawings/Documents	Drg/Doc no	1.	Price Bid Format	Annexure – 1	2.	Master Document List	Annexure – 2	3.	Standard Manufacturing Quality Plan(for reference)	Annexure – 3	4.	Guidelines for QA QC plan	Annexure – 4	5.	Format for Despatch details	Annexure – 5	6.	Typical BBU for IGES system	Annexure – 6	7.	Pre Bid Query Format	Annexure – 7	8.	Input Doc. List	Annexure – 8	9.	Deviation Format	Annexure – 9	10.	Tender purpose Drawings	Annexure – 10	11.	Check List	Annexure-11	12.	Sub-Vendor List	Annexure-12	13.	Typical BOQ Format	Annexure-13
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	Rev. No.	Date	Revision Details	Prepared By	Checked By	Approved By	
	00	06/07/2017	Original Issue	<i>Pras Lamb</i>			
	Ref.						