

CORRIGENDUM/CLARIFICATION- VFD PLC FOR IOCL GUJARAT (DUMAD) PROJECT : PS/445/2741

Sr No	Page No	Clause	Tender Statement	Vendor Query	M/s BHEL Reply
1	30 & 31	Annexure - 3 & 4	-	Clarification on IO count required for PLC system.	a) Tentative I/O list will be as per BHEL spec PS/445/2741 Annexure-3 &4. However, during detail engineering, signal list will be finalized alongwith customer. Also based on VFD vendor's requirement, if any additional I/Os are required between PLC to other equipment for satisfactory & fail safe operation of the system, same shall be considered by vendor in the offer. b)Additional 20% spare I/Os of each type shall be provided duly wired upto TB.
2	69		<p>"1. General</p> <p>a) Programmable logic controller shall be microprocessor-based system, which shall be used to execute all the process, and safety shut down logic of the process plant. Programmable logic controller shall be independent unit. PLC shall be QMR/ TMR/ DMR. Failure of one processor module shall not affect plant operation. Transfer of control shall be achieved in an order of 100 ms. The failed module, when replaced, shall update the program from the running processor. Dual modular redundant (DMR)PLC may be accepted in U&O packages, like cooling tower, Flare, DM plant, RO plant, Nitrogen, Air, Loading etc.</p> <p>b) The scan time of programmable logic controller shall be of the order of 100 milliseconds for TMR and DMR and of the order of 250 milliseconds for QMR, inclusive of processor time required for diagnostics and peripheral data transfer. Redundant power supply units shall be provided for each individual I/O rack, each processor cabinet and programming terminal. TMR/ QMR PLCs shall be considered for process applications and shall be a safety PLC (Minimum SIL-3 as per IEC standard)</p> <p>c) Connectivity from Upstream redundant device to downstream redundant device shall be through redundant device or cable</p> <p>d) It shall be possible to synchronize the time of all PLC systems with the real time of the DCS at a fix time, automatically once in a day. The synchronization shall take place with the GPS clock. Supply of the GPS clock shall also be considered in DCS vendor's scope."</p>	<p>a) We shall quote DMR PLC System. We will offer Ring architecture PLC processor and I/O module interface. Any one cable breaks in the ring the architecture communication will still work .</p> <p>b) We shall consider non safety PLC.</p>	<p>a) DMR type PLC system shall be considered by the VFD vendor.</p> <p>Noted for providing Ring type architecture PLC processor and I/O module interface .</p> <p>b) Fast scan time PLC shall be provided as given in BHEL Specification meeting the changeover time between VFDs as per process requirement.</p> <p>-Noted & acceptable for non safety PLC.</p> <p>c)VFD-1 & 2 shall communicate to PLC and PLC shall have 1 no. Redundant modbus TCP/IP Communication Link with DCS as shown in VFD SLD attached along with BHEL Specification.</p> <p>d) Not applicable for this VFD -PLC.</p>
3	69		<p>a) PLC shall have functionality for sequence of event recording (SER). Resolution of SER shall be in order of PLC scan time. SER format shall be displayed on Engineering console. Time stamping of the alarms shall be displayed in HH:MM: SS: msec (e.g. 11:10:15:240) format.</p> <p>b) SER printer shall be connected to Engineering console for log recording & printing on demand. SER history at PLC ES shall be available for at least three months for each PLC in separate files.</p> <p>c) Maintenance override switches shall be software type. Process override switches shall be hardware type & with key lock. Process override switches shall be mounted on auxiliary console.</p>	<p>a) SER station will not be seperately considered however PLC HMI can record events .</p> <p>b) SER printer & Engineering console will not be considered</p> <p>c) Process override switches are not applicable however as per BHEL specs min switches has been considered. Aux console is not applicable .</p>	<p>a) Noted & accepted.</p> <p>b) Noted & accepted.</p> <p>c) Noted & accepted.</p>
4	70		-It shall be possible to synchronize the time of all PLC systems with the real time of the DCS at a fix time, automatically once in a day. The synchronization shall take place with the GPS clock. Supply of the GPS clock shall also be considered in DCS vendor's scope	We understand that there is already GPS clock install that has been already synch with DCS . THE offered PLC will have the capability to synch the time over NTP .	Noted & accepted.

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5	70	2.0 & 2.1	<p>2.0 System Configuration</p> <p>2.1 Input / Output system</p> <p>- The input / output subsystem shall comprise of termination assemblies, I/O hardware modules, communication modules if any, input barriers for IS inputs, output barriers for IS outputs, input/output relays for non-IS inputs/outputs, interconnection wiring etc.</p> <p>-The input interrogation voltage for DIs shall be 24 VDC. All output voltage to drive relays shall be 24 VDC. All relays related to ESD PLC shall be SIL certified</p> <p>-For triplicate field transmitters/ switches, three individual inputs (analog / Discrete) shall be assigned to three different input cards.</p>	<p>-Please clarify on Intrinsically safe barriers. PLC I/O shall be CH to CH isolated.</p> <p>- This PLC is not ESD PLC hence relays are not SIL certified.</p> <p>-Three I/p card not applicable because DMR not TMR.</p>	<p>- Noted. However, Suitable isolation from external control circuit shall be provided for Digital and Analog I/Os as per customer spec clause no 2.1 in page no 70 of 104.</p> <p>- Noted & accepted.</p> <p>-Noted & accepted.</p>
6	71	2.2	2.2 Processor System	PLC is DMR System.	- Noted.
7	72	2.3	<p>"2.3 PLC Engineering Station</p> <p>-The PLC Engineering Station shall be capable for programming, program storing, fault diagnostics, monitoring, SOE storage etc.</p> <p>-PLC ES shall consist of a monitor having 22" LCD/ TFT with touch screen facility, with Pentium Quad Core PC, 500 GB hard disc, 4GB RAM, DVD Read/writer, keyboard, mouse as minimum and printer.</p> <p>-Each PLC as per attached configuration diagram can be connected to any PLC- ES for independent programming and SOE terminal"</p>	Please clarify if separate PC system is required. We shall consider one engineering laptop as mentioned on Pg 24	- Noted & accepted. Separate PC for PLC is not required.
8	72	2.4	2.4 Interface with Distributed Control System		As per I/O list mentioned in spec Annexure-3 and shown in VFD SLD attached along with BHEL Specification.
9	73	2.6	<p>2.6 Auxiliary Hardware</p> <p>2.6.1. Alarm Annunciation System: (with 48 windows each)</p> <p>Ø One annunciator each for unit shall be considered.</p> <p>Ø Each annunciator shall have 48 windows and test, acknowledge, reset PBs as minimum.</p> <p>Ø Provision to change the state of signal required to generate alarm (from Open to Close or vice versa) by the jumper position on circuit board.</p> <p>Ø Lamps (LED) in window shall be replaceable from the front.</p> <p>Ø Hooter in general, shall be solid state type with audibility of the order of 100 dB at the distance of 3 meters.</p> <p>Ø An interruption of power supply up to 20 msec shall not affect the functioning of unit.</p>	Please clarify if we need to consider separate hardware annunciator for this system.	- Auxiliary hardware is not applicable.
10	73	2.6.2	<p>2.6.2. Auxiliary Consoles:</p> <p>Location of installation: Fully wired for annunciator and miniature illuminated push buttons, selector switches, lamps (LED clusters), Emergency PBs etc. Type of the hardware to be used shall be decided during detail engineering considering the requirement of the plant.</p>		-Not applicable.
11	73	2.6.3	2.6.3. Furniture		-Furniture is not required for PLC.
12	73	3	<p>3. POWER SUPPLY AND DISTRIBUTION</p> <p>The system shall normally operate on uninterrupted power supply unless otherwise specified. The system shall be designed to operate on power supply of following specification. Electrical technical specification for UPS system (44AC9100-0000/E.02/0011/A4.</p>	We shall consider the hardware for the incomer as mentioned on Pg 19 Point No 32 . However please clarify on the mentioned point.	Noted & Confirmed.
13	74	7	<p>1. General</p> <p>-In general, following cabinets shall be required.</p> <p>a. Power distribution cabinets (for AC distribution and DC distribution)</p> <p>b. Barrier, field termination assembly & Marshalling cabinets</p> <p>c. DCS Controller system cabinet.</p> <p>d. DCS I/O cabinets</p> <p>e. Relay cabinets with relays.</p> <p>f. Other auxiliary card mounting cabinets.</p> <p>g. PLC Processor cabinets.</p> <p>h. PLC I/O system cabinet</p>	<p>-We shall consider a single PLC cum I/O System cabinet. Please confirm.</p> <p>-Please clarify on the requirement of Barrier.</p> <p>-DCS Controller and DCS I/O cabinets are not in VFD vendor scope</p> <p>-No separate Relay cabinet shall be considered. Please confirm the points</p>	<p>- Noted and accepted.</p> <p>-Suitable isolation from external control circuit shall be provided for Digital and Analog I/Os as per customer spec clause no 2.1 in page no 70 of 104.</p> <p>- Noted.</p> <p>-Noted and accepted.</p>

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14	74	7 (2)	2. System Cabinets Cabinet shall be Rittal make.	Cabinet shall be powder coated, RAL-7032. Please confirm the colour as it is to be considered to be same as the Drive panel	For PLC cabinet, the following vendors are acceptable. 1. BASE AUTOMATION INDIA 2. INDUSTRIAL CONTROL & APPLIANCES 3. MEGATECH CONTROLS 4. POSITRONICS PVT. LTD 5. PRIMA AUTOMATION INDIA PVT LTD 6. PYROTECH ELECTRONICS PVT LTD 7. RITTAL Panel colour will be confirmed during detail engineering.
15	75	4	4. Wiring for Cabinets & Control Panels -Terminal blocks shall be provided in the racks for signal cable connections between field and system cabinets. Stack type / multi-tier terminal blocks shall not be used. Only cage clamp type terminal blocks shall be used. Cable entries shall be from the bottom. Removable type gland plates shall be provided	- Screw type terminals	- Noted & accepted.
16	76	5	5. Earthing:	We shall provide the bus bar for Instrument earth and power earth.	- Noted & accepted.
17	77	6	6. Miscellaneous Requirements: Transient, static & EMI protection All electrical equipment shall incorporate electrical transient protection on the power input & on all interfaces to inputs & outputs. System shall withstand applied surges without damage to components or without operating errors according to requirements of IEEE C37.90.1, surge withstand capability. Surge protectors wherever necessary shall be considered All system components shall have electromagnetic interference (EMI) immunity as per SAMA PMC 33.1.		-As per PLC manufacturer's standard considering system & site requirement.
18	78,79, 80 & 81	7 & 8	7. GENERAL REQUIREMENTS OF DCS & PLC SYSTEM		As per BHEL specification.
			8.1 Scope		As per BHEL specification.
			8.2 Logistic Support Services		As per BHEL specification. Training will be provided both for VFD & PLC .
			8.2.1 Training		As per BHEL specification.
			8.2.2 DCS & PLC Engineering, Hardware and Software Maintenance Training		As per BHEL specification.
			8.2.3 Operations Training		As per BHEL specification.
			8.3 Spare Parts support		As per BHEL specification.
			8.4 Documentation		As per BHEL specification.
8.5 Warranty		Same as VFD.			
8.6 ANNUAL MAINTENANCE CONTRACT		Not applicable			
19	82 to 87	8	TESTING, INSTALLATION, COMMISSIONING AND ACCEPTANCE OF DCS & PLC SYSTEM.		As per BHEL specification.
20					PLC controllers and I/O modules, communication modules, power supply modules etc. shall have corrosive environmental protected for G3 class as per ISA-S71.04 or equivalent and the conformal coating shall be from the manufacturing facility.