



Corrigendum- I

TPNODL/OT/2021-2022/2200000025 Dtd.29.04.2022

Rate Contract for SITC of 33kV and 11kV Control & Relay Panels in TPNODL Area.

Dated 26th May 2022

Following changes in tender document is made; (Event Calender, & Technical Specification)

Event Calendar:


(a)	Last Date of receipt of Tender Fees	04.06.2022 ; 15:00 Hrs
(b)	Last Date of receipt of PreBid Query	30.06.2022; 15:00 Hrs
©	Last Date of PreBid Query Reply	02.06.2022; 18:00 Hrs
(d)	Last date and time of receipt of Bids	07.06.2022 up to 15:00 Hrs
(e)	Date & Time of opening technical bids & EMD	07.06.2021 up to 15:30 Hrs

Note :- In the event of last date specified for submission of bids and date of opening of bids is declared as a closed holiday for TPNODL, the last date of submission of bids and date of opening of bids will be the following working day at appointed times.

All other terms and conditions of the above tender shall remain unaltered.

**Yours faithfully,
-sd-**


**HoD - Contracts
TPNODL, Balasore**

 TPNODL TP NORTHERN ODISHA DISTRIBUTION LIMITED <small>(A Joint Venture of Odisha Power and Odisha Government and NTPCL)</small>	TP NORTHERN ODISHA DISTRIBUTION LIMITED, BALASORE	
	TECHNICAL SPECIFICATION	
Doc. Title	Specification for protection IEDs	
Doc. No		Eff. Date:17.05.2022
Rev. No	00	
Prepared By: ASMITA JENA	Reviewed By: TAPAN KUMAR BEHERA	Approved & Issued By: SANDIP PAL

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1.0	Scope	The scope of this specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading of IEDs and all other items & tools required for protection of 33Kv and 11kV power system as mentioned in the specification, at site/stores complete with all accessories including supply, installation, testing and commissioning of efficient and trouble free protection system. The specific requirements are covered in the enclosed technical data sheet.
2.0	Applicable Standards	The equipment covered by this specification shall unless otherwise stated, be designed, constructed and tested in accordance with latest revisions of relevant Indian/IEC/other applicable standards shall confirm to the regulations of local statutory authorities.
2.1	IS 9000	Basic Environmental testing procedure for electrical and electronic items
2.2	IS 3231:Part 3:Sec 1	Specification for Electrical Relays for Power System Protection - Part 3 : Requirements for Particular Group of Relays - Section 1 : Non-specified Time or Independent Specified Time Measuring Relays
2.3	IS 3231:Part 3:Sec 2	Specification for Electrical Relays for Power System Protection - Part 3 : Requirements for Particular Group of Relays - Section 2 : Dependent Specified Time Measuring Relays
2.4	IS 3231:Part 3:Sec 3	1987 Specification for Electrical Relays for Power System Projection - Part 3 : Requirements for Particular Group of Relays - Section 3 : Biased (Percentage) Differential Relays
2.5	IEC 60255	Measuring Relays and Protection Equipment
2.6	IS 694-1990	PVC insulated cables for working voltage up to and including 1100V
2.7	IS 2629-1985	Recommended practice for Hot Dip Galvanizing of iron & Steel.
2.8	IS 2633-1986	Test for uniformity of Zinc Coating

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2.9	IEC 60529	Degrees of Protection provided by enclosures (IP Code)
2.10	IEC 62052-11	Electricity metering equipment (a.c.) – General requirements, tests & test conditions
2.11	IEC 62053-22	Static meter for active energy (Class 0.2S and 0.5S)
2.12	IEC 61850	Communication networks and systems in substations (all parts including IEC 61850-8-1, IEC 61850-9-2)
2.13	IEC 61869-9	Digital Interface for Instrument Transformers
2.14	IEC 61869-13	Stand-alone Merging Units
2.15	IEC 61588/IEEE 1588v2	Precision clock synchronization protocol for networked measurement and control systems
2.16	IEC 62351	Power systems management and associated information exchange - Data and communications security
3.0	Climatic Conditions of the Installations	<p>The service conditions shall be as follows:</p> <ol style="list-style-type: none"> 1. Maximum altitude above sea level 1,000m 2. Maximum ambient air temperature 50°C 3. Maximum daily average ambient air temperature 35°C 4. Minimum ambient air temperature 0°C 5. Maximum relative humidity 95% 6. Average number of thunderstorm days per annum (isokeraunic level) 70 7. Average number of rainy days per annum 120 8. Average annual rainfall 150cm

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		<p>9. Earthquakes of an intensity in horizontal direction - equivalent to seismic acceleration of 0.3g</p> <p>10. Earthquakes of an intensity in vertical direction - equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)</p> <p>11 .Wind velocity: 300 km/hr, 200 km/hr and 160 km/hr. environmentally, some of the regions, where the work will take place includes coastal areas, subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for outdoor insulators. Some places are in heavily industrial polluted areas. Therefore, Outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive and humid coastal atmosphere</p>
4.0	General Technical Requirements	
4.1	General Requirements from the Business Associates	<ul style="list-style-type: none"> • The supplier should have at least 30 years of experience in design and supply of control and protection systems for electricity transmission and distribution applications. • The manufacturer, whose protection system is offered, should have designed, manufactured, tested, installed and commissioned such a system for electricity transmission and distribution for at least two decades. The conditions in this document is applicable for a single IED or multiple IED, new commissioning and retrofitting jobs. • The manufacturer needs to submit the proof of completing such tasks with other utilities/concerns and sister utilities as its experience certificate for last 3 years. • The Business Associate can offer an innovative and advanced system. The offer is subjected to an approval from TPNODL after a thorough discussion between the BA and TPNODL. In case, an approval is not awarded to the BA's offered innovative system, TPNODL existing/desired infrastructure prevails

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		<p>and the BA shall provide the system accordingly.</p> <ul style="list-style-type: none"> • The BA should optimize on the cost of software products offered to TPNODL considering already available licenses with TPNODL . The BA should clearly indicate licensing policy for the software tools offered. • The BA should provide necessary training to the personnel recommended by TPNODL to maintain the system and troubleshooting reports which is not less than 3 days. • The BA should provide the MIB Files of all Numerical Protection IEDs to integrate the SNMP Traps with Network Management System • The numerical relay must have an IEC 61850 Edition 1, Edition 2 level A certification from DNVGL / KEMA and Relay shall also support site selectable minimum RSTP.
4.2	General Construction of IED	<p>General built:</p> <p>Protection and control IED should be internal modular in design. By the term internal modularity means the cards of the relay should be housed inside with no exposure. By the term internal modularity it also means that there should be no conjunction with external IO devices by means of any fiber or any other cable or cable bus instead they should be an integral part of the main/ mother device by means of pin to pin configuration. No separate configuration tool will be allowed along with no proprietary communication between the devices. The device shall be flush mounted type with draw out design so that one to one replacement be very easy for operation and regular maintenance of the IEDs. The draw out design should be such that there be no cards left in the relay after the draw out process and CT terminals of the casing gets automatically shorted as soon as the drawing out process is initiated. The IEDs temperature dissipation should be such that no intrusion of insects or any tiny living things is possible by any means. If the construction design is such then OEM needs to provide some additional arrangement to proof the intrusion of any tiny living things or its excretion. Every PCB in the IED should have conformal coating. All PCB used in relays should have harsh environmental coating as per standard IEC 60068 (HEC) to</p>

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		<p>increase the particle repellency and thereby increasing the life of relay. Test report needs to be submitted. IED shall be manufactured using lead-free components.</p> <p>Enclosure protection shall be IP54 from front and IP 20 from rear. All the necessary wirings to be terminated at the back of the relay with sufficient comfortable spacing so that wiring and testing becomes very easy for working personnel. All the terminals should be ring type. No terminals shall be vertically aligned looking from the straight rear of the IED.</p> <p>Equipment shall be designed for a working life of at least fifteen years in the specified environment and application. Components, component ratings and all other factors determining equipment life shall take this into account. Normal routine and breakdown maintenance shall be assumed and it is accepted that certain consumable components and modules may need periodic replacement or adjustment. However, the Bidder shall state in his bid, the expected frequency of such replacement or adjustment and life expectancy.</p> <p>Fascia:</p> <p>The fascia of the IED should have a clear and bright LCD display where SLD can be seen clearly of the respective bay along with following parameters clearly from 1 meter distance</p> <ol style="list-style-type: none"> 1. Name of the bay 2. Date and time running 3. CT ratio 4. All three phase current 5. All three phase voltage in phase to phase basis <p>The display should have minimum 4 pages to cater sequential values (positive, negative and zero) of voltages and current along with other important displayable parameters like total harmonic distortion of electrical parameters.</p> <p>Tactile keypad or navigation keys for browsing and setting the relay menu.</p> <p>There should be user configurable LEDs (minimum 10) in the relay fascia for</p>
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		<p>suitable annunciation configuration as per site suitability. The LED marking style should not be permanent type, there should be LED strip which can be easily changed as per the need of the user. The LED strip required to be printed out (hard copy or software configured) to be provided. There should be a LED in green color to indicate device is working and healthy.</p> <p>The relay fascia also should contain dedicated close and open button for CBs or any other switches which a user wish to control. Minimum number of such switches is 5 including CB which can be configured in the IED.</p> <p>The front fascia of the IED should contain a communication port to get connected with the device. The details of the port feature will be given in the communication part.</p> <p>There should a reset button which by default clears all the LEDs (programmable and non-programmable) and reset all the outputs in one go. If any button can be configured for the same purpose then same feature is also acceptable.</p> <p>Inputs & Outputs:</p> <p>The auxiliary input should be suitable for both 24V and 48V DC. The auxiliary input circuit shall be protected by surge protection device in the relay itself so that no external DC voltage or high AC voltage can damage the delicate PCB components.</p> <p>The quantity of analogue input is 4 for both current and voltage. The current channel should be rated for both 5A and 1A. Necessary selection based on field input (1 or 5) to be made by selection through software. The short time current rating of the current coils to be mentioned by bidder and should not be less than 4 times continuous. Conventionally, analog values are injected directly into the IED through instrument transformers. IEDs combine analog-to-digital conversion of the signals with their analysis (digital filtering) and decision-making algorithms. The sampling frequency should not be less than 32 samples/ cycle.</p> <p>Suitable measures shall be provided to ensure that transients present in CT & VT connections due to extraneous sources in the HV system do not cause</p>
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		<p>damage to the numerical and other IEDs. CT saturation shall not cause mal-operation of numerical IEDs.</p> <p>The voltage inputs shall be such that at least one voltage coil be capable of withstanding phase to phase voltages, so that on need based “SYNC” function can be used.</p> <p>The digital input shall be suitable for 24V and 48V DC application. The input card in the IED should have necessary surge protection circuit as mentioned above for auxiliary power supply card. The inputs shall be opto-coupler type. There should be minimum 3 number inputs having its own positive and negative terminals i.e. no common negative or positive terminal. There should be feature for digital/ binary input sensing delay in the relay which can be adjusted through the software and relay fascia. The BI pick up value should be more than 70% of rated DC voltage, should not pickup for AC voltage.</p> <p>The digital output shall be suitable for 24V and 48V DC application. The outputs shall be free of potential type when they are not subjected any kind of external wiring. There should be minimum 4 power contacts to handle high current rating applications. The current rating of the power contacts to be provided by the bidder. Programming of outputs can be done freely both from software and relay fascia.</p> <p>The device should have minimum 1 watchdog contact.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Voltage Level</th> <th colspan="2">Conventional Substation</th> </tr> <tr> <th>BCPU</th> <th>PU</th> </tr> </thead> <tbody> <tr> <td>11kV</td> <td>BI-20 BO-10</td> <td>BI-20 BO-10</td> </tr> <tr> <td>33kV</td> <td>BI-24 BO-12</td> <td>BI-16 BO-10</td> </tr> </tbody> </table>	Voltage Level	Conventional Substation		BCPU	PU	11kV	BI-20 BO-10	BI-20 BO-10	33kV	BI-24 BO-12	BI-16 BO-10
Voltage Level	Conventional Substation												
	BCPU	PU											
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Protection Functions:

	<p><u>Feeder Protection</u></p> <ol style="list-style-type: none"> 1) No protection settings will be lost on accidental DC failure or device reboot. 2) The protection function measurement should be selectable i.e. DFT (Digital Fourier transform), RMS, Peak to Peak etc. 3) The IED/ relay should have following protection functions with any settable magnitude of actuating electrical quantity and lowest time delay of 0.00 ms. The settings groups can be as much as 4 numbers as minimum. 4) O/C minimum 4 stages with 2 DT element (Practically any PSM selection and any TMS selection with resolution of 0.001 lowest at 0.01). 5) E/F minimum 4 stages with 2 DT element (Practically any PSM selection and any TMS selection with resolution of 0.001 lowest at 0.01) 6) Minimum one IDMT stage for OC & EF. All IEC curves (NI-3 Sec, VI, EI etc) should be selectable. 7) All IDMT stage should have Disk emulation or Time delayed reset curve. 8) Both over voltage and under voltage protection each of minimum 3 stages. 9) Blocking of this function on minimum voltage settings (< 5V) and 1 out of 3 phase and 3 out of 3 phases. 10) Negative Phase Sequence protection with minimum 2 stages 11) Breaker failure protection 12) Broken conductor(I_2/I_1) with minimum 2 stages 13) Fault locator (Analogue value, same to be mapped at SCADA) 		
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		<p>14) Fault current and voltage (Analogue value, same to be mapped at SCADA for all 4channels)</p> <p>15) Auto reclose feature with minimum 4 shots with adjustable time settings forevery shot interval and shot properties (Dead time, reclose time etc)</p> <p>16) VT supervision</p> <p>17) CT supervision</p> <p>18) Fuse Failure protection</p> <p>19) High impedance protection for earth faults in OH lines</p> <p>20) Every protection function should have blocking facility</p> <p>21) I²t feature to monitor breaker wear and tear</p> <p>22) Sync check</p> <p>23) Inrush blocking functions with cross block feature</p> <p>24) Power (MW, MVAR, MVA) and cos phi, derived quantity.</p> <p>25) Energy Metering Functionality. (MWh, MVAh, Monthly Demand (MVA-15 min block)</p> <p>There should be some alarm generation facility on some protection functions mentioned above in the software so that certain protection functions can be used for logic making for the adaptive functioning of the relay. For example, if a relay senses a certain magnitude of forward power for 1 minute then the relay will change its direction from FORWARD to Non-directional. Here on completion of the protection function of forward power relay should generate an alarm signal which will be used in logic for group change, not for tripping.</p>	

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		<p>The difference between 33 KV IED and 11 KV IED will be, 33 KV device should have directional protection.</p> <p>26) Maximum Torque Angle (MTA): Selectable MTA (RCA) for Directional Relay should cover 1st quadrant in a non-effectively grounded system. Step Size 1° and should have selectable area of operation.</p> <p>27) Polarizing voltage for 67N: 1V to 67 Volt, Step size 1V.</p> <p>28) Blocking of directional function with FFR (Fuse Failure)</p> <p><u>Transformer Differential Protection Relay</u></p> <p>29) Transformer main protection IED DI/DO details mentioned above, please refer. LED number will be same as mentioned above.</p> <p>30) One separate analogue input for SEF protection enablement. Protection functions shall be as below</p> <p>31) Inrush blocking with cross block feature for selectable time delay.</p> <p>32) Current Differential with following feature -Zero sequence compensation, Vector group compensation, Inrush (2nd & 5th restrain) and cross block with selectable time, CT saturation detection algorithm and blocking,</p> <p>33) Restricted EF Protection (High Impedance and Biased type both)</p> <p>34) Sensitive EF protection</p> <p>35) 4-20 mA input for WTI & OTI temperature monitoring and trending.</p> <p>36) RTCC functionality with (a) 4-20 mA input for Tap number indication (b) Auto tap changer based on voltage input and Manual tap changer from SCADA</p> <p>37) Harmonics measurement</p>
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		38) Transformer Trouble	

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		<p><u>Master trip relay (86)</u></p> <ol style="list-style-type: none"> 1) The relay shall be electrical and hand reset type having operating time not more than 12 ms. 2) The relay should be flush mounting type and having minimum 6 NO and 2 NC contacts. 3) The Flag should also get reset from remote 4) Illuminated type push Button should be used for resetting the 86. <p>Ports:</p> <p>The device should have front port serial communication, interface may be anything but RJ45 and USB type are most wanted.</p> <p>Rear ports shall be redundant in nature with minimum RSTP as requirement for client server communication.</p> <p>Rear ports should be either of electrical or optical RJ45 type.</p> <p>All the configuration whether device configuration or system configuration can be uploaded from or downloaded to IED without any system or device configuration change</p> <p>All configuration are uploading or downloading should be possible any of the relay ports irrespective of IEC 61850 configuration</p> <p>Relay should communicate all the time independent of default/ control and any other screen</p> <p>Downloading/ uploading file from any relay ports shall not change its 61850 engineering and device engineering</p> <p>No port with proprietary communication shall be accepted</p>
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		<p>SNTP with minimum two number of server to be there in the IED</p> <p>SNMP shall be made available in each IED.</p> <p>The IED should be communicated by remote servers through the gateway configured in the IED.</p> <p>Web HMI should be made available in the relay so that relay can be accessed from remote from computer browser.</p> <p>The web HMI should facilitate every possible access which can be done from relay fascia</p> <p>In the relay front there shall be a must control authority in terms of LOCAL and REMOTE either by lock and key or by any fascia button (which can also be initiated by Binary or digital input) so that on choosing LOCAL it does not accept any remote command.</p> <p>Diagnosis:</p> <p>The numerical IEDs shall have continuous self-monitoring & cyclical test facilities. The internal clock of the system shall be synchronized through the GPS Time Synchronizing System to be provided by Owner at later date.</p> <p>Should tell about the internal and hardware problem by its diagnosis tool. The diagnosis tool may be the software for its configuration or other than configuration software.</p> <p>Forcing of all kinds of inputs and outputs</p> <p>Forcing of all kinds of protection functions</p> <p>Forcing of all Led's</p> <p>Relay should be reboot from the relay key and through software also</p>
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		<p>Diagnosis tool/ software to declare pattern of failure or pre failure conditions</p> <p>List of frequent failure error codes and their meaning and proper preventive action</p> <p>Oscillography:</p> <p>Waveform generation option shall be different (On which functions waveform will be generated shall be selected by user)</p> <p>What an waveform will show shall be different from above (Including all current channels and voltage channels, digital channels minimum 24)</p> <p>Transformer differential relay should have all HV and LV analogue channels, biasing current, restraint current.</p> <p>Phasor with sequential values</p> <p>Sequential values in any representation (value in A, V or percentage of positive sequences)</p> <p>With two or more cursor availability in DR software to facilitate clear demarcation of pre fault, fault and post fault behavior.</p> <p>Transient play back facilities in the IED software</p> <p>Any configurable protection characteristics</p> <p>Any program generated output</p> <p>Any DI & DO</p> <p>Any program generated input</p> <p>Store Any waveform even if dc fails.</p> <p>Any goose sending signals</p>
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		<p>Any goose receiving signals</p> <p>The oscillographic record can be exported to comtrade format. Nature of storage is FIFO minimum 20 sec (configuration should be possible as per user selectable choice like window for the record, number of records etc.)</p> <p>System Events:</p> <p>600 Events minimum</p> <p>Function pickup & Dropout of event to be captured</p> <p>Time resolution of 1ms</p> <p>Can be read from relay fascia as well as from software.</p> <p>Events of a single change be it bi, bo, program generated IP, op, protection signal, GOOSE signals etc to be either automatically come or user configurable.</p> <p>Events should be downloadable from front and back ports with out changing a single configuration of the device</p> <p>All event shall be readable from relay fascia also</p> <p>Fault events are different than system events and shall be downloadable from relay fascia as well as from software.</p> <p>Software:</p> <p>Maximum number of software to interface with relay will be 2 in number to engineer relay from device and IEC 61850 system point of view. These 2 number software required for device configuration, system configuration of IED, waveform uploading/ downloading/ viewing.</p> <p>Device engineering and IEC 61850 system configuration to be done from the same software</p> <p>Software to have every function of configuration and parameterization that is</p>
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		<p>available from relay fascia</p> <p>Device to have minimum 3 level of security with user ID and password protection to access device from configuration, parameterization, accessibility, 61850 configuration & event or oscillography downloading</p> <p>Software restart facility for the device</p> <p>Software testing facility for the device (when device is protecting, necessary point to point testing can be done by simulating wanted signals from software.</p> <p>The relays provided should comply with Indian or international standards of cyber security like NERC CIP / BDEW / IEEE 1686 or equivalent for cyber security to provide protection against unauthorized disclosure, transfer, modification, or destruction of information and/or information systems, whether accidental or intentional.</p> <p>There should also be separate logic in IED to cater breaker operation counter on faults only. This counter should not be reset to zero upon device rebooting or accidental relay power off.</p> <p>On resetting the BCPU/PU from SCADA or Locally from relay all the protection signals must be get reset both at SCADA and at relay with relay outputs in one go. If separate logics required to meet the same, then same can be formulized.</p> <p>Device order code of 11kV IEDs (BCPUs & PUs) must have same order codes irrespective of panel types for better IEC61850 project management and one to one replacement. For 11kV panels both BCPU and PU order code will be the same. Device order code of 33kV BCPUs must have same order code for better IEC 61850 project management and one to one replacement.</p> <p>The bidder shall provide Any software licenses for Any the software being used in Protection IED offered for engineering, IED setting uploading and FDR down loading etc. The license shall be provided on a site license</p>
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		<p>basis and shall be valid for the plant / Equipment life cycle. In the case of anti-virus software, the license all include regular updates. The Bidder All guarantee that Any software are defect free and meet the System specifications, and undertake to fix any defects Which may arise during the life of the system at no cost to the Owner.</p> <p>Any software versions in components all be the latest official releases as on the date of shipment from works and all include Any software updates etc. released till that date. A certificate to this effect all be furnished by the bidder at the time of pre-dispatch inspection for each software package. Any new software revisions and/or patch updates that are released before the end of the warranty period which addresses system defects all be implemented on site and the system re-tested to validate system integrity by the bidder at no cost to the owner (This excludes new revisions which provides additional functionality). The bidder all periodically inform the designated officer of the Owner about software updates / new releases that would be taking place after the system is commissioned.</p> <p>Bidder all train our engineers to guide the upgrading procedures of project files with respect to latest releases.</p> <p>Two nos. of communication cords for each type of relay uploading and down loading data from front and rear port of Protection IED all be supplied by the bidder. One no. of Serial to USB Converter to be supplied by bidder.</p> <p>Station Project Files all be ready before raising inspection call & submission of the internal test report by the Bidder.</p> <p>Bidder all submit 2 copies of as built drawings & station project files in soft format in a pen drive.</p> <p>The technical key should be as per provided SLD like 11KVIC2, 33KVIC1, 33KVPTR2 etc. The same shall be elaborated at the stage of detailed</p>
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		<p>engineering and finalization of order code.</p> <p>Report control blocks to be configured during initial programming of the relays. The desired signals and their types will be provided in detailed engineering stage.</p> <p>IP address will be provided along with SNTP sever address at the time of detailed engineering</p> <p>CT PT ration to be provided at the time of detailed engineering</p> <p>Successful bidder will ask user on which software platform necessary relay files will be made, it's not in scope of bidder, however bidder may suggest.</p> <p>All protection functions and control functions to be made off with appropriate settings adopted discussed in detailed engineering stage.</p> <p>Bidder to propose type of IEDs (like latest released version) they are providing at the time of detailed engineering.</p> <p>There should be feature for digital/ binary input sensing delay in the relay which can be adjusted through the software and relay fascia.</p> <p>Transient play back facilities in the IED software</p> <p>Virtual simulation of all kinds of inputs and outputs (while relay is online and working and in service)</p> <p>Virtual simulation of all kinds of protection functions (while relay is online and working and in service)</p> <p>Virtual simulation/ forcing of all Led's (while relay is online and working and in service)</p> <p>Relay should be reboot from the relay key and through software also</p>
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		<p>The number of program generated input and output to be framed by bidder. Minimum number for both are 32 respectively.</p> <p>The number of Goose input and output to be framed by bidder, however minimum number for both are 20 respectively.</p> <p>Protection and Control IEDs respond to the signals of currents and voltages measured at certain points of the power system, and assess the state of the protected power system component. The System shall be suitable for operation and monitoring of the complete substation including future extensions and shall works on IEC 61850. The device shall be freely configurable to both IEC 61850 edition 1 and edition 2. The device shall be capable to report to 6 clients minimum. It should be compatible with SCL/SCD files generated by a third-party system.</p> <p>Being new installation or retrofitting activity there should be always presence of OEM engineer though OEM or any party may put in third party for the said job.</p>
4.3	Fibre Optic Cable	<p>Between Control Room and Switchyard/Switchgear Room: 4 Core, 62.5/125µm Multi-mode, Loose tube, Jelly filled, Armoured Fiber Optic Cable</p> <p>Within Control Room: 2 Core, 62.5/125µm Multi-mode Fiber Optic Patch Chord</p>
4.4	CAT – VI	<p>4 Pairs, 23 AWG Solid Bare Copper Conductor, PE Insulation, Unshielded Twisted Pair (UTP) with separator and PVC Outer Jacket</p> <p>It should be designed to the ANSI/TIA-568-C.2 ISO / IEC 11801 Category 6 requirements and transmit data at 1000 Mbps (~1 Gigabit per second) with a frequency of 250 MHz and suitable for 10BASE-T, 100BASE-TX Fast Ethernet</p>

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		and 1000BASE-T / 1000BASE-TX (Gigabit Ethernet).
4.5	Tests	<p>Factory Acceptance Test: The manufacturing phase of the C&R Panel all be concluded by the factory acceptance test (FAT). The purpose is to ensure that the Contractor has interpreted the specified requirements correctly and that the FAT includes checking to the degree required by the user. The general philosophy all be to deliver a system to site only after it has been thoroughly tested and its specified performance has been verified, as far as site conditions can be simulated in a test lab. If the FAT comprises only a certain portion of the system for practical reason, IED Configuration and Database all be prepared completely as per actual site requirement and it will submit to TPNODL for validation. An integrated-FAT all be conducted as per the TPNODL I-FAT Document (ENG-EHV-1006 Rev. 00 - Annexure-III). If the complete system consists of parts from various suppliers or some parts are already installed on site, in such case supplier will arrange the intra-communication between RTU/DC and such IEDs to meet the requirement.</p> <p>Hardware Integration Tests all be performed on the specified systems to be used for Factory tests when the hardware has been installed in the factory. The operation of each item all be verified as an integral part of system. Applicable hardware diagnostics all be used to verify that each hardware component is completely operational and assembled into a configuration capable of supporting software integration and factory testing of the system. The equipment expansion capability all also be verified during the hardware integration tests.</p> <p>Integrated System Tests all verify the stability of the hardware and the software. During the tests Any functions all run concurrently and Any equipment all operate a continuous 100 Hours period. The integrated system test all ensure the IEDs is free of improper interactions between software and hardware while the system is operating as a whole.</p>
5.0	Type Test Certificates	Test reports for following type tests all be submitted for the Protection IED

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		along with the Bid		
5.1	Insulation Test	S. No.	Description	Standard
		1	Dielectric Withstand Test	IEC 60255-5 ANSI/IEEE C37.90-1989 2kV rms for 1 minute between Any case terminals connected together and the case earth. 2kV rms for 1 minute between Any terminals of independent circuits with terminals on each independent circuit connected together. 1kV rms for 1 minute across the open contacts of the watchdog IEDs. 1kV rms for 1 minute across open contacts of changeover output IEDs. 1.5kV rms for 1 minute across open contacts of normAny open output IEDs.
		2	High Voltage Impulse Test, class III	IEC 60255-5 5kV peak; 1.2/50 μ sec; 0.5J; 3 positive and 3 negative shots at intervals of 5s
5.2	Electrical Environment Tests	S. No.	Description	Standard
		1	DC Supply Interruption	IEC 60255-11 The unit will withstand a 20ms interruption in the auxiliary supply, in its quiescent state, Without de-energizing.
		2	AC Ripple on DC supply	IEC 60255-11 The unit will withstand a 12% ac ripple on the dc supply.
		3	AC voltage dips and short Interruptions	IEC 61000-4-11 20ms interruptions/dips.
		4	High	IEC 60255-22-1, class III

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			<p>Frequency Disturbance</p> <p>At 1 MHz, for 2s with 200 ohms\square source impedance: 2.5kV peak; 1 MHz; T = 15 μsec; 400 shots/sec; duration 2 sec between independent circuits and independent circuits and case earth. 1.0kV peak across terminals of the same circuit.</p>
	5	Fast Transient Disturbance	IEC 60255-22-4, class IV 4kV, 2.5kHz applied directly to auxiliary supply 4kV, 2.5kHz applied to Any inputs.
	6	Surge Withstand Capability	IEEE/ANSI C37.90.1 (1989) 4kV fast transient and 2.5kV oscillatory applied directly across each output contact, opticAny isolated input and power supply circuit.
	7	Radiated Immunity	C37.90.2: 1995 25MHz to 1000MHz, zero and 100% square wave modulated. Field strength of 35V/m.
	8	Electrostatic Discharge	IEC 60255-22-2 Class 4 15kV discharge in air to user interface, display and exposed metal work. IEC 60255-22-2 Class 3 8kV discharge in air to Any communication ports. 6kV point contact discharge to any part of the front of the product.
	9	Surge Immunity	IEC 61000-4-5: 1995 Level 4 4kV peak, 1.2/50ms between Any groups and case earth. 2kV peak, 1.2/50ms between terminals of each group.
	10	Capacitor Discharge	No change of state or any operation all occur when a capacitor of capacitance shown below, charged to 1.5 \times Vn volts, is connected between any combination of terminals and any

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				combination of terminals and ground. Master trip circuits - 10 μ F Other protection & control circuits - 2 μ F Carrier/channel interface - 0,2 μ F
5.3	EMC Test	S. No.	Description	Standard
		1	Radio-Frequency Electromagnetic Field, Non-Modulated	IEC 60255-22-2, class III 10 V/m; 27 MHz to 500 MHz
		2	Radio-Frequency Electromagnetic Field, Amplitude Modulated	ENV 50140, class III 10 V/m; 80 MHz to 1000 MHz; 80% AM; 1 kHz
		3	Radio-Frequency Electromagnetic Field, Pulse Modulated	ENV 50140/ENV 50204 10 V/m; 900 MHz; repetition frequency 200 Hz; duty cycle 50 %
		4	Disturbances Induced by Radio Frequency fields, Amplitude Modulated	ENV 50141, class III 30 A/m continuous; 300 A/m for 3 sec; 50 Hz
		5	Power Frequency Magnetic Field	EN 61000-4-8, class IV 30 A/m continuous; 300 A/m for 3 sec; 50 Hz
		6	Interference	EN 50081-*

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			Voltage, Aux. Voltage	150 kHz to 30 MHz
		7	Interference Field Strength	EN 50081- * 30 MHz to 1000 MHz
5.4	Atmospheric Environment Test	S. No.	Description	Standard
		1	Temperature	IEC 60255-6 Operating –25°C to +55°C Storage and transit –25°C to +70°C IEC 60068-2-1 for Cold IEC 60068-2-2 for Dry heat
		2	Humidity	IEC 60068-2-3 56 days at 93% RH and +40°C
5.5	Mechanical Stress Test	S. No.	Description	Standard
		1	Vibration (during Operation & Transportation)	IEC 255-21-1; IEC 68-2-6 Response Class 2 Endurance Class 2
		2	Shock (during Operation and Transportation)	IEC 255-21-2, class 1, IEC 68-2-27 Shock response Class 2 Shock withstand Class 1 Bump Class 1
		3	Seismic Vibration (during Operation)	IEC 60255-21-3 Class 2
		4	Continuous Shock (during Transportation)	IEC 255-21-2, class 1, IEC 68-2-27
6.0	Pre-Dispatch Inspection	<p>Equipment all be subject to inspection by a duly authorized representative of the Purchaser as detailed at Clause No.6.0. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material, the same is liable to rejection.</p> <p>Bidder all grant free access to the places of manufacture to Purchaser's representatives at Any times when the work is in progress. Inspection by the</p>		

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		<p>Purchaser or its authorized representatives all not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications Material all be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by the Purchaser.</p> <p>Following documents all be sent along with material :</p> <ul style="list-style-type: none"> a) Test reports b) MDCC issued by TPNODL c) Invoice in duplicate d) Packing list e) Drawings & catalogue f) Guarantee / Warranty card g) Delivery ChAnyan h) Other Documents (as applicable)
7.0	Inspection after receipt at Stores	<p>Equipment/material received at TPNODL-TPNODL's store all be inspected by Stores Department and all be liable for rejection, if found different from Pre-Dispatch Inspection Report.</p> <p>One copy of the Inspection Report all be sent to the Plant Engineering and Protection & Testing Departments.</p>
8.0	Guarantee/ Warranty Details	<p>Bidder all stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Company up to a period of 84 months from the date of commissioning supplier all be liable to undertake to replace/rectify such defects at his own costs within the mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover Any such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.</p> <p>Bidder all further be responsible for 'free replacement' for another period of three years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Company</p>
9.0	Packing	Bidder all ensure that Any equipment covered by this specification all be prepared for rail/road transport (local equipment) and be packed in such a

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		manner as to protect it from damage in transit.
10.0	Tender Sample	Not Applicable
11.0	Training	<p>The successful Bidder all provide training for relay configuration with goose messaging at supplier's works/ users location - 4 persons 3 days minimum to Engineers before dispatch. Venue of the training all be Bidders works or TPNODL - TPNODL Office and same all be finalized by TPNODL - TPNODL at the time of project closure/completion of SAT. The training all cover Engineering configuration of the IED, IED setting calculations, uploading/downloading, secondary injection testing on computerized IED testing kit, checking of DC logic etc. No extra charges all be payable for training However, lodging/boarding/transportation of trainees all be borne by TPNODL - TPNODL.</p> <p>Supplier personnel who are experienced instructors and who speak understandable English all conduct training. The Supplier all arrange on its own cost Any hardware training platform required for successful training and understanding in India at manufacturer's work. The Supplier all provide Any necessary training material including configuration document in advance. Each trainee all receive individual copies of Any technical manuals and Any other documents used for training. Class materials, including the documents sent before the training courses as well as class handouts, all become the property of Employer. Employer reserves the right to copy such materials, but for in-house training and use only. Hands-on training all utilize equipment identical to that being supplied to Employer. For Any training courses, the travel (e.g., airfare) and per-diem expenses will borne by the participants. The schedule, location, and detailed contents of each course will be finalized during Employer and Supplier discussions.</p>
12.0	Quality Control	The bidder all submit with the offer, quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and after finishing, bought out items and fully assembled component and equipment including drives. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule all be furnished. The

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		purchaser's engineer or its nominated representative all have free access to the manufacturer/sub-supplier's works to carry out inspections.
13.0	Minimum Testing Facilities	The Bidder all have in house testing facilities for carrying out Any routine tests and acceptance tests as per relevant international/Indian standards.
14.0	Manufacturing Activities	The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart all be in line with the Quality assurance plan submitted with the offer. The bar chart will have to be submitted within 15 days from the release of the order.
15.0	Spares, Accessories and Tools	<p>Bidder need to furnish the expected life of IEDs While submitting the performance reports of the concerned IEDs. Bidders need to provide life cycle support and supplies to ensure Necessary support in terms of services and spares for next 15 years regarding discontinuation OEM must need to follow clauses 3.15 & 6 of IEC 61850-4. The example cases should be taken as reference.</p> <p>Bidder need to provide life cycle support and supplies to ensure necessary support in terms of services and spares for next 15 years from date of Purchase Order. Bidder all provide expected life of IEDs in writing.</p> <p>Bidder all conform to the following guideline to mitigate failure. To provide immediate support in case of failure of IED. The Bidder all always maintain 2 Nos. of IEDs as spare at their India office/ TPNODL - TPNODL office.</p> <ul style="list-style-type: none"> • Bidder all report to site within 48 hours of receipt of reporting of the failure occurrence. • Bidder all provide replacement of the faulty IEDs within 7 days after confirmation of the fact that the IED can't be repaired at site. • Bidder all provide detailed root cause analysis report of the faulty IEDs within 30 days from the date of the IED receipt. • Any spare IED replacement, testing and its commissioning to

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		<p>be done by Bidder only without any cost implications. Any equipment, any software or any hardware to test the IEDs to be borne by Bidder only.</p> <ul style="list-style-type: none"> Any up gradation in application software and IED (except hardware) will be informed to us and necessary up gradation to be carried out by Bidder without any cost implications. <p>Spares for Project job for New Grids / Bay Extension</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="5" style="text-align: center;"> Same MLFB No/ Order Code across 11kV Board including PU. BCPU MLFB No / Order Code all remain same across 33kV Board. </td> </tr> <tr> <td colspan="5" style="text-align: center;">Relays for 11kV panels</td> </tr> <tr> <td colspan="2" style="text-align: center;">Total No. of (main & backup) relays in Panel board to be supplied</td> <td colspan="3" style="text-align: center;">No. of Spare relays</td> </tr> <tr> <td colspan="2" style="text-align: center;">1-10</td> <td colspan="3" style="text-align: center;">1</td> </tr> <tr> <td colspan="2" style="text-align: center;">11-20</td> <td colspan="3" style="text-align: center;">2</td> </tr> <tr> <td colspan="2" style="text-align: center;">21-30</td> <td colspan="3" style="text-align: center;">3</td> </tr> <tr> <td colspan="2" style="text-align: center;">31-40</td> <td colspan="3" style="text-align: center;">4</td> </tr> <tr> <td colspan="5" style="text-align: center;">33kV panel</td> </tr> <tr> <td rowspan="2" style="text-align: center;">No. of Panels</td> <td colspan="2" style="text-align: center;">No. of Spare Relays</td> <td colspan="2" style="text-align: center;">Bus Differential applicable for 33kV AIS</td> </tr> <tr> <td style="text-align: center;">BCPU</td> <td style="text-align: center;">Line PU</td> <td style="text-align: center;">Transformer PU</td> <td></td> </tr> <tr> <td>2 Line, 2 Trafo, 1 B/C</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> <tr> <td>4 Line, 2 Trafo, 1 B/C</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> <tr> <td>4 Line, 3 Trafo, 1 B/C</td> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> <tr> <td>6 Line, 3 Trafo, 1 B/C</td> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> <tr> <td>1 line, 1 Trafo, 1 B/C</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> <tr> <td>2 line, 1 Trafo, 1 B/C</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> </table> <table border="1" style="margin-left: auto; margin-right: auto; margin-top: 10px;"> <tr> <td colspan="2" style="text-align: center;">Master Trip Relay (86) common for 33kV and 11kV</td> </tr> <tr> <td style="text-align: center;">No. of relays in Panels</td> <td style="text-align: center;">No. of Spare relays</td> </tr> <tr> <td style="text-align: center;">1-10</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">11-20</td> <td style="text-align: center;">2</td> </tr> </table>	Same MLFB No/ Order Code across 11kV Board including PU. BCPU MLFB No / Order Code all remain same across 33kV Board.					Relays for 11kV panels					Total No. of (main & backup) relays in Panel board to be supplied		No. of Spare relays			1-10		1			11-20		2			21-30		3			31-40		4			33kV panel					No. of Panels	No. of Spare Relays		Bus Differential applicable for 33kV AIS		BCPU	Line PU	Transformer PU		2 Line, 2 Trafo, 1 B/C	1	1	1	1	4 Line, 2 Trafo, 1 B/C	1	1	1	1	4 Line, 3 Trafo, 1 B/C	2	1	1	1	6 Line, 3 Trafo, 1 B/C	2	1	1	1	1 line, 1 Trafo, 1 B/C	1	1	1	1	2 line, 1 Trafo, 1 B/C	1	1	1	1	Master Trip Relay (86) common for 33kV and 11kV		No. of relays in Panels	No. of Spare relays	1-10	1	11-20	2
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Initiator		HoG (Plant Engineering)	
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 TPNODL TP NORTHERN ODISHA DISTRIBUTION LIMITED <small>(A Subsidiary of Odisha Government)</small>	TP NORTHERN ODISHA DISTRIBUTION LIMITED, BALASORE	
	TECHNICAL SPECIFICATION	
Doc. Title	Specification for protection IEDs	
Doc. No		Eff. Date:17.05.2022
Rev. No	00	
Prepared By: ASMITA JENA	Reviewed By: TAPAN KUMAR BEHERA	Approved & Issued By: SANDIP PAL


		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">21-30</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">31-40</td> <td style="text-align: center;">4</td> </tr> </table> <p>Services to be included during tender</p> <ul style="list-style-type: none"> i. Tri- party agreement to be made to have protection against quitting of executing Bidder. ii. In case total failure of IEDs during the warranty period exceeds 20% of the installed quantity of respective type at a particular station then Bidder to configure these as some latent defect and configure replacement of Any IEDs in its scope without any cost implication to TPNODL . i. Preferably Any the IEDs all have conformal coating to take care of any external environmental polluting effect etc. TPNODL all not be responsible if any such reason causes failure of cards/IEDs and each all be Bidder's responsibility to replace IED without any cost implication to TPNODL . 	21-30	3	31-40	4
21-30	3					
31-40	4					
16.0	Drawings and Documents	<p>Following drawings and documents all be prepared on Purchaser's specifications and statutory requirements and all be submitted with the bid:</p> <ol style="list-style-type: none"> 1. Completely filled in Technical Particulars 2. General description of the equipment and Any components including brochures 3. Bill of material 4. Type test certificates 5. Hardware Specification 6. Sizing Calculations of various component 7. Standard Drawings 8. ICD/CID Cite (IED capability description file) 9. SCD file (substation configuration description) 10. MIB Files of IEDS <p>After the award of the contract four (4) copies of drawings, drawn to scale, describing the equipment in detail all be forwarded for approval and all</p>				

Initiator		HoG (Plant Engineering)	
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 TPNODL TP NORTHERN ODISHA DISTRIBUTION LIMITED <small>(A Subsidiary of Odisha Power Corporation Limited)</small>	TP NORTHERN ODISHA DISTRIBUTION LIMITED, BALASORE	
	TECHNICAL SPECIFICATION	
Doc. Title	Specification for protection IEDs	
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		<p>subsequently provide four (4) complete sets of final drawings, one of which all be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (pen drive) of Any the drawing, GTP, Test certificates all be submitted after the final approval of the same to purchaser.</p> <p>Any the documents & drawings all be in English language.</p> <p>Instruction Manuals: Bidder all furnish two softcopies (pen drives) covering erection and maintenance instructions and Any relevant information and drawings pertaining to the main equipment as well as auxiliary devices.</p>
17.0	Guaranteed Technical Particulars	Bidder all submit separate sheet showing compliances on Any other clauses of the specification

Initiator		HoG (Plant Engineering)	
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 TPNODL TP NORTHERN ODISHA DISTRIBUTION LIMITED <small>(A State Owned and Odisha Government Joint Venture)</small>	TP NORTHERN ODISHA DISTRIBUTION LIMITED, BALASORE	
	TECHNICAL SPECIFICATION	
Doc. Title	Specification for protection IEDs	
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21.0 SCHEDULE OF DEVIATIONS

(TO BE ENCLOSED WITH THE BID)

Any deviations from this specification all be set out by the Bidders, clause by Clause in this schedule. Unless specificAny mentioned in this Schedule, the tender all be deemed to confirm the purchaser's specifications:

S. No.	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

Designation

Signature

Initiator		HoG (Plant Engineering)	
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