

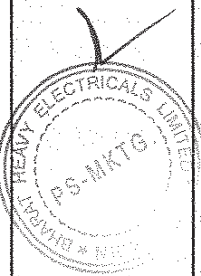
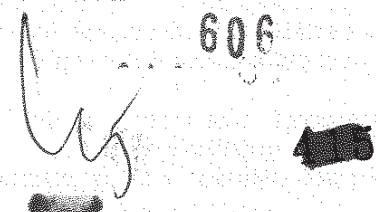


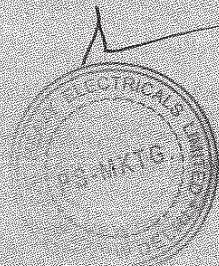
CLAUSE NO.	TECHNICAL REQUIREMENTS 		
11.00.00	CONDUITS		
11.01.00	<p>Conduits shall be generally used for interconnecting cables from field instruments to Local JB's. All rigid conduits, couplings and elbows shall be hot dipped galvanized rigid mild steel in accordance with IS: 9537 Part-I (1980) and Part-II (1981). The conduit interior and exterior surfaces shall have continuous zinc coating with an overcoat of transparent enamel lacker or zinc chromate. Flexible conduit shall be heat resistant lead coated steel, The temperature rating of flexible conduit shall be suitable for the following areas:</p> <p>(i) Mills (ii) Drum (iii) Main steam, RH steam (iv) Air Heaters (v) Furnace, BFPDTs</p> <p>For the remaining applications, water leak, fire and rust proof flexible GI conduits shall be provided.</p>		
11.02.00	The Bidder shall install conduits according to the general routing as approved by Employer and shall coordinate conduit locations with other works.		
11.03.00	All grounding bushings within all enclosures shall be wired together and connected internally to the enclosure grounding lug or grounding bus with 8 AWG bare copper conductor. Conduit runs to individually mounted equipment shall be grounded to the Employer's cable tray grounding conductor with 12 AEG bare copper conductor. All grounding bushings, clamps and connectors shall be subject to approval of the Employer.		
11.04.00	All rigid conduit fittings shall conform to the requirements of IS: 2667, 1976. Galvanized steel fitting shall be used with steel conduit. All flexible conduit fittings shall be liquid tight, galvanized steel. The end fittings shall be compatible with the flexible conduit supplied.		
11.05.00	All individually mounted equipment and devices shall be connected to the supply conduit, using not more than one meter of flexible conduit adjacent to the equipment or device. Flexible conduit shall be installed in all conduit runs, which are supported by both building steel and structures subject to vibration or thermal expansion. This shall include locations where conduit supported by building steel enters or becomes supported by the turbine generator foundation and where conduit supported by building steel or foundation becomes supported by steam generator framing.		
11.06.00	Special areas, such as control rooms in which external noise is to be minimized, shall have flexible conduit in conduit runs where the runs cross from the main building framing to the control room framing.		
11.07.00	<p>Conduit supports shall be furnished and installed in accordance with these specifications. Support material shall comply with the following requirements.</p> <p>Hanger rods shall be 12 mm diameter galvanized threaded steel rods.</p> <p>Single conduit supports shall be one-hole cast metal straps and clamp backs unless other types are acceptable to the Employer. Multiple conduit bank supports shall be constructed of special galvanized support channels with associated conduit clips.</p>		
11.08.00	Conduit sealing, explosion proof, dust proof and other types of special fittings shall be provided as required by these specifications and shall be consistent with the area and equipment with which they are installed. Fittings installed outdoors and in damp locations		
LARA STPP (2x800MW) / DARLIPALI STPP-I (2 x 800MW) / GAJMARA STPP-I (2x 800MW) / KUDGI STPP-I (3 x 800MW) STEAM GENERATOR PACKAGE	605 TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2	PART - B SUB-SECTION-IV: 17 (INSTR. AND POWER SUPPLY CABLE)	PAGE 13 OF 14

CLAUSE NO.	TECHNICAL REQUIREMENTS 		
	shall be sealed and gasketed. Hazardous area fittings and conduits sealing shall conform to NEC requirements for the area classification.		
11.09.00	Contractor shall provide double locknuts on all conduit terminations not provided with threaded hubs and couplings. Water tight conduit unions and rain tight conduit hubs shall be utilized for all the application which shall be exposed to weather. Moisture pockets shall be eliminated from conduits.		
11.10.00	Conduits shall be securely fastened to all boxes and cabinets.		
12.00.00	CABLE SUB-TRAY & SUPPORT		
12.01.00	The cable sub-trays and the supporting system, to be generally used between Local/Group JB's and the main cable trays and the same shall be furnished and installed by the Contractor. It is the assembly of sections and associated fittings forming a rigid structural system used to support the cable from the equipment or instrument enclosure upto the main cable trays (trunk route).		
12.02.00	The covers on the cable sub-trays shall be used for protection of cables in areas where damage may occur from falling objects, welding spark, corrosive environment, etc. & shall be electrically continuous and solidly grounded. The cable trays shall not have sharp edges, burrs or projections injurious to the insulation or outer sheath of the cables.		
12.03.00	The supporting arrangement of cable tray system shall be able to withstand the weight of the cable and cable tray system. The supporting interval shall not be more than the recommended span for the above loading for the type of cable tray selected. The tray shall not overhang by more than one meter from the support at the dead end. As far as practicable the cable sub-tray system shall be supported from one side only, in order to facilitate installation and maintenance of cables.		
12.04.00	The Bidder shall furnish and install the estimated quantities and sizes of sub trays/troughs including all required fittings and adaptors on as required basis.		
	<p style="text-align: center;">606</p> 		
LARA STPP (2x800MW) / DARLIPALI STPP-I (2 x 800MW) / GAJMARA STPP-I (2x 800MW) / KUDGI STPP-I (3 x 800MW) STEAM GENERATOR PACKAGE	TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2	PART - B SUB-SECTION-IV: I7 (INSTR. AND POWER SUPPLY CABLE)	PAGE 14 OF 14



SUB-SECTION-IV: I9


TYPE TEST REQUIREMENTS




614

LARA SUPER THERMAL POWER PROJECT (2x800MW) /
DARLIPALI SUPER THERMAL POWER PROJECT - I (2 x 800MW) /
GAJMARA SUPER THERMAL POWER PROJECT - I (2x 800MW) /
KUDGI SUPER THERMAL POWER PROJECT - I (3 x 800MW)
STEAM GENERATOR PACKAGE

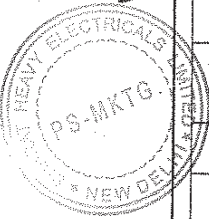
TECHNICAL SPECIFICATION
SECTION-VI
BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2

CLAUSE NO.	TECHNICAL REQUIREMENTS	
1.00.00	<p style="text-align: center;">TYPE TEST REQUIREMENTS</p> <p>TYPE TEST REQUIREMENTS</p> <p>General Requirements</p> <p>The Contractor shall furnish the type test reports of all type tests as per relevant standards and codes as well as other specific tests indicated in this specification. A list of such tests are given for various equipment in table titled 'TYPE TEST REQUIREMENT FOR C&I SYSTEMS' at the end of this chapter and under the item Special Requirement for Solid State Equipments/Systems. If the bidder proposes a different standard/code from that indicated at table 3.00.00, the same is acceptable provided the equivalence of the proposed standard is established by the bidder. For the balance equipment instrument, type tests may be conducted as per manufactures standard or if required by relevant standard.</p> <p>(a) Out of the tests listed, the Bidder/ sub-vendor/ manufacturer is required to conduct certain type tests specifically for this contract (and witnessed by Employer or his authorized representative) even if the same had been conducted earlier, as clearly indicated subsequently against such tests.</p> <p>(b) For the rest, submission of type test results and certificate shall be acceptable provided.</p> <p>i. The same has been carried out by the Bidder/ sub-vendor on exactly the same model /rating of equipment. (For control valves, this shall be same size, type & design).</p> <p>ii. There has been no change in the components from the offered equipment & tested equipment.</p> <p>iii. The test has been carried out as per the latest standards along with amendments as on the date of Bid opening.</p> <p>(c) In case the approved equipment is different from the one on which the type test had been conducted earlier or any of the above grounds, then the tests have to be repeated and the cost of such tests shall be borne by the Bidder/ sub-vendor within the quoted price and no extra cost will be payable by the Employer on this account.</p> <p>As mentioned against certain items, the test certificates for some of the items shall be reviewed and approved by the main Bidder or his authorized representative and the balance have to be approved by the Employer.</p> <p>The schedule of conduction of type tests/ submission of reports shall be submitted and finalized during pre-award discussion.</p> <p>For the type tests to be conducted, Contractor shall submit detailed test procedure for approval by Employer. This shall clearly specify test setup, instruments to be used, procedure, acceptance norms (wherever applicable), recording of different parameters, interval of recording precautions to be taken etc. for the tests to be carried out.</p> <p>The Bidder shall indicate in the relevant BPS schedule, the cost of the type test for each item only for which type tests are to be conducted specifically for this project. The cost shall only</p>	
<p>LARA STPP (2x800MW) / DARLIPALI STPP-I (2 x 800MW) / GAJMARA STPP-I (2x 800MW) / KUDGI STPP-I (3 x 800MW) STEAM GENERATOR PACKAGE</p>	<p>TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2</p>	<p style="text-align: center; font-size: 24px;">615</p> <p>PART - B SUB-SECTION-IV:19 TYPE TESTS REQUIREMENTS</p> <p style="text-align: right;">PAGE 1 OF 6</p>

CLAUSE NO.	TECHNICAL REQUIREMENTS 																												
2.00.00	<p>be payable after the respective type tests are conducted in presence of authorized representative of Employer. If a test is waived off, then the cost shall not be payable.</p> <p>SPECIAL REQUIREMENT FOR SOLID STATE EQUIPMENTS/ SYSTEMS</p> <p>The minimum type test reports, over and above the requirements of above clause, which are to be submitted for each of the major C&I systems shall be as indicated below:</p> <p>i) Surge Withstand Capability (SWC) for Solid State Equipments/ Systems</p> <p>All solid state systems/ equipments shall be able to withstand the electrical noise and surges as encountered in actual service conditions and inherent in a power plant. All the solid state systems/ equipments shall be provided with all required protections that needs the surge withstand capability as defined in ANSI 37.90.1/ IEEE-472. Hence, all front end cards which receive external signals like Analog input & output modules, Binary input & output modules etc. including power supply, data highway, data links shall be provided with protections that meets the surge withstand capability as defined in ANSI 37.90.1/ IEEE-472. Complete details of the features incorporated in electronics systems to meet this requirement, the relevant tests carried out, the test certificates etc. shall be submitted along with the proposal. As an alternative to above, suitable class of EN 61000-4-12 which is equivalent to ANSI 37.90.1/ IEEE-472 may also be adopted for SWC test.</p> <p>ii) Dry Heat test as per IEC-68-2-2 or equivalent.</p> <p>iii) Damp Heat test as per IEC-68-2-3 or equivalent.</p> <p>iv) Vibration test as per IEC-68-2-6 or equivalent.</p> <p>v) Electrostatic discharge tests as per EN 61000-4-2 or equivalent.</p> <p>vi) Radio frequency immunity test as per EN 61000-4-6 or equivalent.</p> <p>vii) Electromagnetic Field immunity as per EN 61000-4-3 or equivalent.</p> <p>Test listed at item no. v, vi, vii, above are applicable for electronic cards only as defined under item (i) above.</p>																												
3.00.00	<p>TYPE TEST REQUIREMENT FOR C&I SYSTEMS</p> <table border="1" data-bbox="391 1398 1425 1797"> <thead> <tr> <th>Sl. No</th> <th>Item</th> <th>Test Requirement</th> <th>Standard</th> <th>Test To Be Specifically Conducted</th> <th>NTPC's Approval Req. On Test Certificate</th> </tr> <tr> <th>Col 1</th> <th>Col 2</th> <th>Col 3</th> <th>Col 4</th> <th>Col 5</th> <th>Col 6</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Elect. Metering instruments</td> <td>As per standard (col 4)</td> <td>IS-1248</td> <td>No</td> <td>Yes</td> </tr> <tr> <td>2</td> <td>Thermocouple</td> <td>Degree of protection test</td> <td>IS-2147</td> <td>No</td> <td>No</td> </tr> </tbody> </table>					Sl. No	Item	Test Requirement	Standard	Test To Be Specifically Conducted	NTPC's Approval Req. On Test Certificate	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	1	Elect. Metering instruments	As per standard (col 4)	IS-1248	No	Yes	2	Thermocouple	Degree of protection test	IS-2147	No	No
Sl. No	Item	Test Requirement	Standard	Test To Be Specifically Conducted	NTPC's Approval Req. On Test Certificate																								
Col 1	Col 2	Col 3	Col 4	Col 5	Col 6																								
1	Elect. Metering instruments	As per standard (col 4)	IS-1248	No	Yes																								
2	Thermocouple	Degree of protection test	IS-2147	No	No																								
<p>LARA STPP (2x800MW) / DARLIPALI STPP-I (2 x 800MW) / GAJMARA STPP-I (2x 800MW) / KUDGI STPP-I (3 x 800MW) STEAM GENERATOR PACKAGE</p>		<p>TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2</p>	<p>PART - B SUB-SECTION-IV:19 TYPE TESTS REQUIREMENTS</p>	<p>PAGE 2 OF 6</p>																									



CLAUSE NO.	TECHNICAL REQUIREMENTS				
3	RTD	As per standard (col 4)	IEC-60751	No	No
4	Electronic transmitter	As per standard (col 4)	BS-6447 / IEC-60770	No	Yes
5	E/P converter	As per standard (col 4)	Mfr. standard	No	Yes
6	Instrumentation Cables Twisted & Shielded				
	-Conductor	Resistance test	VDE-0815	No	Yes
		Diameter test	IS-10810	No	Yes
		Tin Coating test (Persulphate test)	IS-8130	No	Yes
	-Insulation	Loss of mass	VDE 0472	No	Yes
		Ageing in air ovens**	VDE 0472	No	Yes
		Tensile strength and elongation test before and after ageing**	VDE 0472	No	Yes
		Heat shock	VDE 0472	No	Yes
		Hot deformation	VDE 0472	No	Yes
		Shrinkage	VDE 0472	No	Yes
		Bleeding & blooming	IS-10810	No	Yes
	-Inner sheath***	Loss of mass	VDE 0472	No	Yes
		Heat shock	VDE 0472	No	Yes
		Cold bend/cold impact test	VDE 0472	No	Yes
		Hot deformation	VDE 0472	No	Yes



617

LARA STPP (2x800MW) /
DARLIPALI STPP-I (2 x 800MW) /
GAJMARA STPP-I (2x 800MW) /
KUDGI STPP-I (3 x 800MW)
STEAM GENERATOR PACKAGE

TECHNICAL SPECIFICATION
SECTION-VI
BID DOC NO.: CS-9548/ 9549/ 9566/
9573-102-2

PART - B
SUB-SECTION-IV:19
TYPE TESTS
REQUIREMENTS

PAGE 3 OF 6

CLAUSE NO.	TECHNICAL REQUIREMENTS				
		Shrinkage	VDE 0472	No	Yes
	-Outer sheath	Loss of mass	VDE 0472	No	Yes
		Ageing in air ovens**	VDE 0472	No	Yes
		Tensile strength and elongation test before and after ageing**	VDE 0472	No	Yes
		Heat shock	VDE 0472	No	Yes
		Hot deformation	VDE 0472	No	Yes
		Shrinkage	VDE 0472	No	Yes
		Bleeding & blooming	IS-10810	No	Yes
		Colour fastness to water	IS-5831	No	Yes
		Cold bend/ cold impact test	VDE-0472	No	Yes
		Oxygen index test	ASTMD-2863	No	Yes
		Smoke Density Test	ASTMD-2843	No	Yes
		Acid gas generation test	IEC-60754-1	No	Yes
	-fillers	Oxygen index test	ASTMD-2863	No	Yes
		Acid gas generation test	IEC-60754-1	No	Yes
	-AL-MYLAR shield	Continuity test		No	Yes
		Shield thickness		No	Yes
		Overlap test		No	Yes
	-Over all cable	Flammability Test	IEEE 383	No	Yes



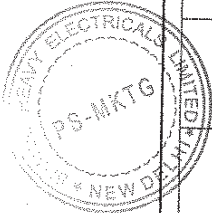
618

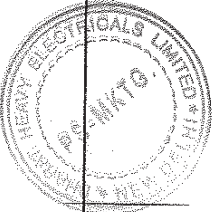
LARA STPP (2x800MW) /
DARLIPALI STPP-I (2 x 800MW) /
GAJMARA STPP-I (2x 800MW) /
KUDGI STPP-I (3 x 800MW)
STEAM GENERATOR PACKAGE

TECHNICAL SPECIFICATION
SECTION-VI
BID DOC NO.: CS-9548/ 9549/ 9566/
9573-102-2

PART - B
SUB-SECTION-IV:19
TYPE TESTS
REQUIREMENTS

PAGE 4 OF 6

CLAUSE NO.	TECHNICAL REQUIREMENTS				
		Swedish Chimney Test	SEN 4241475	No	Yes
		Noise interference	IEEE Transactions	No	Yes
		Dimensional checks	IS 10810	No	Yes
		Cross talk	VDE-0472	No	Yes
		Mutual capacitance	VDE-0472	No	Yes
		HV test	VDE-0815	No	Yes
		Drain wire continuity		No	Yes
* For Drain wire only.					
**These tests shall be carried out as per VDE0207 Part 6 & ASTM D-2116 for TEFLON insulated & outer sheathed cables					
***Applicable for armoured cables only					
7	DC Power Supply System The Type Test reports for offered rectifier module and the controller module irrespective of the rectifier bank shall be acceptable				
		Degree of Protection	IS-13947 or equivalent	No	Yes
		Dry Heat Test	IEC-68-2-2 or equivalent	No	Yes
		Damp Heat test	IEC-68-2-3 or equivalent	No	Yes
		Vibration test	IEC68-2-6 or equivalent	No	Yes
		Electromagnetic field immunity	EN 61000-4-3 or equivalent	No	Yes
		Radio frequency immunity test	EN-61000-4-3 or equivalent	No	Yes
		Electrostatic discharge test	EN 61000-4-2 or equivalent	No	Yes
	619				
	LARA STPP (2x800MW) / DARLIPALI STPP-I (2 x 800MW) / GAJMARA STPP-I (2x 800MW) / KUDGI STPP-I (3 x 800MW) STEAM GENERATOR PACKAGE	TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2	PART - B SUB-SECTION-IV:19 TYPE TESTS REQUIREMENTS	PAGE 5 OF 6	

CLAUSE NO.	TECHNICAL REQUIREMENTS				
		Surge Withstand Capability (SWC)	ANSI 37.90.1/ IEEE-472, EN 61000-4-12	No	Yes
8	Battery	As per standard	IS-10918	No	Yes
9	Voltage Stabiliser	Over Load Test	Approved procedure	No	Yes
		Temp rise test without redundant fans	Approved procedure	No	Yes
		Input voltage variation test	Approved procedure	No	Yes
10	DDCMIS				
	BMS	Safety requirements	VDE0116 Sec 8.7	No	Yes
11	Conductivity Type Level Switch	Degree of protection test	IS-2147	No	No
12	Local Gauges	Degree of protection test	IS-2147	No	No
13	Process actuated Switches	Degree of protection test	IS-2147	No	No
14	Control Valves	CV test	ISA 75.02	No	Yes
15	PLCs	As per standard	IEC 1131	No	No
16	LIE / LIR	Degree of protection test	IS-2147	No	Yes
17	Flue gas O2 analyser, other Flue Gas analysers	Degree of protection test	IS-2147	No	Yes
18	Flow Nozzle Orifice plates	Calibration	ASME PTC BS 1042	No	Yes
<p>Note:</p> <p>Type Tests are to be conducted only for the items, which are being supplied as a part of this Package.</p>					
		<p style="text-align: center;">620</p>			
LARA STPP (2x800MW) / DARLIPALI STPP-I (2 x 800MW) / GAJMARA STPP-I (2x 800MW) / KUDGI STPP-I (3 x 800MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2		PART - B SUB-SECTION-IV:19 TYPE TESTS REQUIREMENTS	
				PAGE 6 OF 6	

CLAUSE NO.

SCOPE OF SUPPLY & SERVICES



9.00.00

CONTROL AND INSTRUMENTATION FOR PLANT AUXILIARY SYSTEMS

9.01.00

Instrumentation and Control System with interlocks, protection and annunciation of the mechanical common auxiliary systems as mentioned below shall be provided. All necessary equipments/system for control, monitoring and operations of the plants as well as the incomers and bus couplers shall be provided.

9.02.00

For certain plants, facility for control from DDCMIS shall be provided as mentioned below:


Sl No	Auxiliary Plant	Control System	Connectivity/operation
01	Auxiliary Boiler (if applicable)	Independent control system in SG-C&I hardware	Dual two way Ethernet connectivity to Station LAN for information
02	Fuel Oil Pressurization/ Heating System (FOPH) & Fuel oil unloading system	Independent control system in SG-C&I based Hardware. I/O count for Fuel oil unloading system is 200 binary and 20 analogs.	Dual two way Ethernet connectivity to station LAN for information and control. Local operation of Fuel oil Handling System through GIU.
03	Mill Reject System (Unitised System)	SG C&I Based Control System from Control Room	Graphical interface unit (GIU) based local operation apart from CCR.
04	Air Compressor System including Air-Compressors of Mill Reject System	If the controller is integral to compressor, then Microprocessor/ PLC based control system along with suitable operator interface as per vendor's practice for individual Air compressors control. If the controller for individual compressors is not integral to compressor then control shall be through SG-C&I For both the cases, over all Control shall be through SG-C&I	Two way Ethernet Connectivity to SG-C&I for information and overall Control of Air Compressors. (Applicable only for compressors with integral controllers)
05	LP Dosing and Oxygenated treatment	Control from BOP-C&I under Station C&I package (in Employer's scope).	
06	Equipment Cooling Water System	Control from BOP-C&I under Station C&I Package	

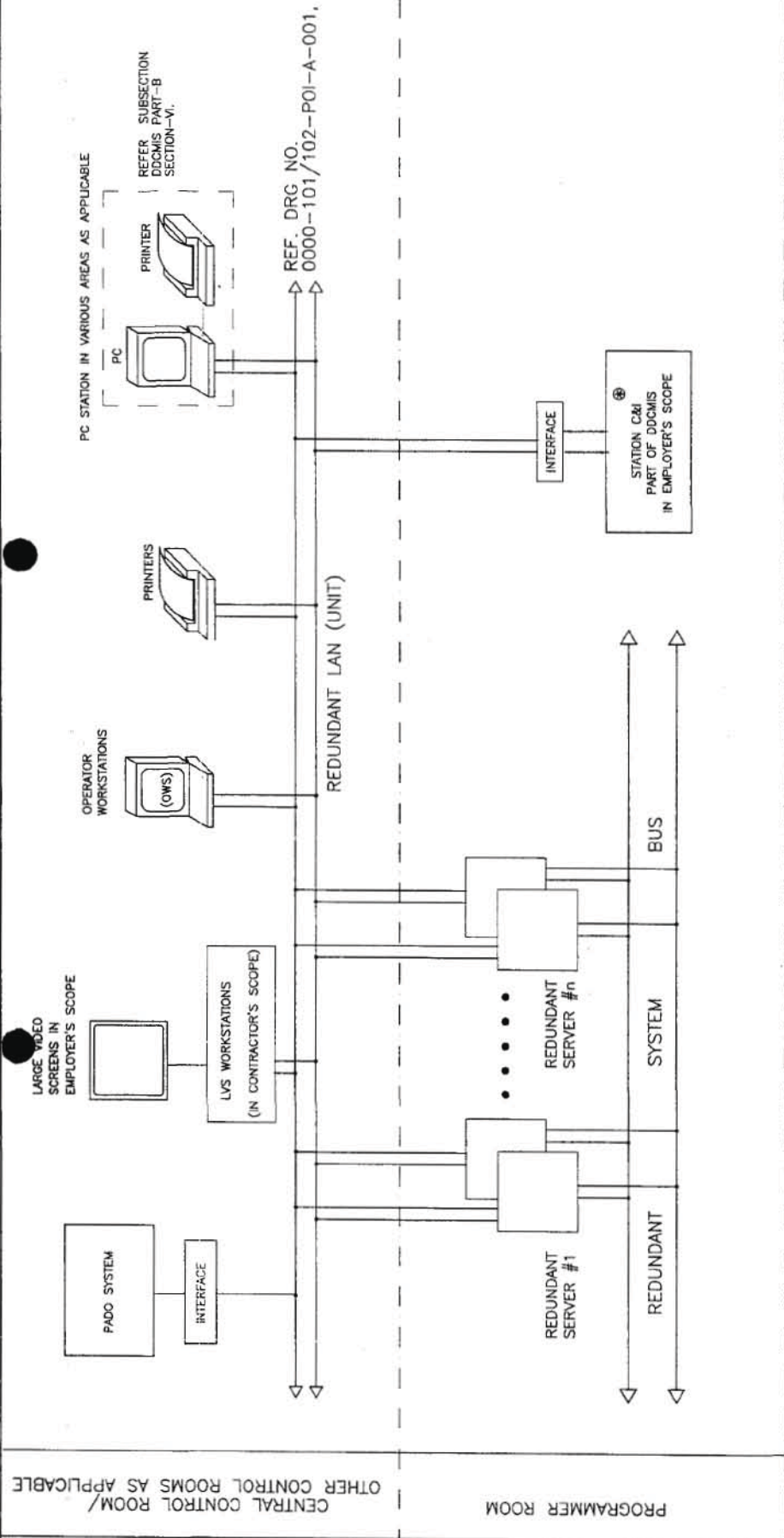
DARLIPALI SUPER THERMAL POWER PROJECT
STAGE-I (2x 800MW)
STEAM GENERATOR PACKAGE

TECHNICAL SPECIFICATION
SECTION-VI
BID DOC. NO.: CS-9549-102-2

PART-A
SUB-SECTION-III:C
CONTROL AND
INST. SYSTEM

PAGE
7 OF 8

CLAUSE NO.	SCOPE OF SUPPLY & SERVICES					
3.00.00	INDEPENDENT CONTROL SYSTEMS					
	SI No	DDCMIS SYSTEM	LOCATION			
	1.	Fuel oil Pressurization system	Fuel Oil pump house			
	2.	Auxilliary Boiler (if applicable)	Auxilliary Boiler Building			
4.00.00	LIST OF AREAS FOR WHICH SOFT SIGNALS ARE TO BE CONNECTED TO SG C&I OR BOP C&I					
	SI No	Area	System to which Connected	Minimum Qty of links/ Location	Type	Qty of signals
	1.	Steam Generator floor per Unit	SG C&I System of each unit	Two nos. per unit	Field bus / Profibus/other industry standard bus for temperature transmitter for metal temperature applications	On as required basis.
	2.	SG Charger in each unit	SG C&I of respective unit		RS 485/ RS232	20 per charger
5.00.00	Control Systems of the auxiliary systems shall be provided with connectivity to DDCMIS systems as follows:					
	SI No.	Description of the system	System to which to be connected	Remarks		
	1.	Control system of Fuel Oil Pressurizing/Heating System	Station wide LAN under BOP C&I			
	2.	Air compressor system	SG-C&I for supervisory control of all compressors.	If any signals are required for control or monitoring and the same are not available through link, the same shall be hardwired to SG-C&I.		
	3.	Air compressors of Mill reject system	SG-C&I			
	4.	Auxiliary Boiler Control System	SG C&I	(if applicable)		
DARLIPALI SUPER THERMAL POWER PROJECT STAGE-I (2x 800MW) STEAM GENERATOR PACKAGE	TECHNICAL SPECIFICATION SECTION-VI BID DOC.NO:CS-9549-102-2	PART-A SUB-SECTION-III:C APPENDIX - I	PAGE 5 OF 13			



No part of this document will be reproduced by any means without the written permission. This document is the property of NATIONAL THERMAL POWER CORPORATION LTD.

NOTE:- 1. FOR CONTRACT QUANTITIES, REFER SUBSECTION APPENDIX-1 TO SG C&I, PART-A, SECTION VI [FOR TENDER PURPOSE ONLY] OF TECHNICAL SPECIFICATIONS.

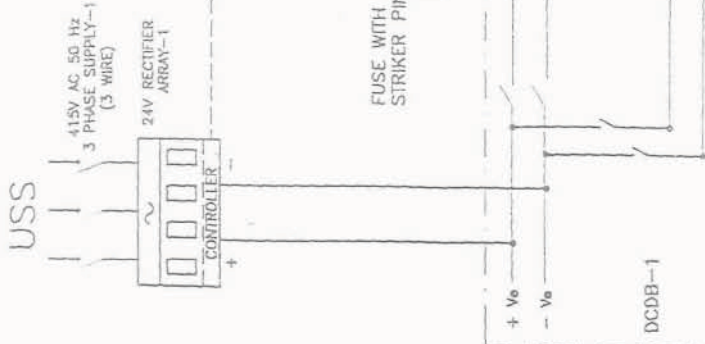


NTPC LTD
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT		TYPICAL THERMAL POWER PROJECT SG PACKAGE	
TITLE		HUMAN MACHINE INTERFACE & PLANT INFORMATION SYSTEM (HMIPIS) CONFIGURATION DIAGRAM (ALTERNATE-1)	
REV. NO.	DESCRIPTION	DATE	APPD
A			
SIZE	SCALE	DRG. NO.	REV. NO.
N.T.S.	N.T.S.	0000-101/102-POI-A-011	A

SECTION C3, SUB-SECTION II

SET-1



SET-2



NOTES:- 1. SUITABLE INTERLOCK SYSTEM SHALL BE PROVIDED IN FLOAT/BOOST CHARGING MODE.

LEGEND:

ISOLATOR

MCB

FUSE

FOR TENDER PURPOSE ONLY

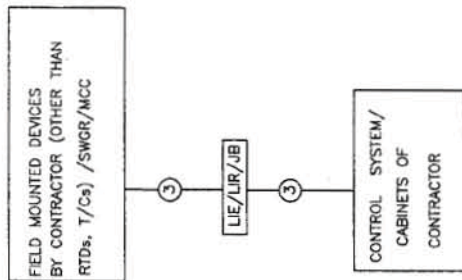
TWO SET CONFIGURATION

NTPC. LIMITED
(A GOVT. OF INDIA ENTERPRISE)

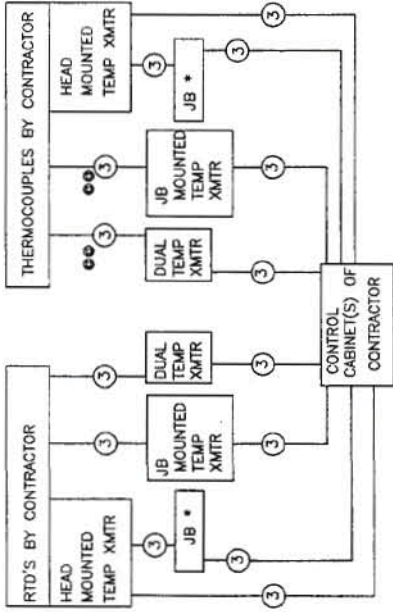
PROJECT		TYPICAL THERMAL POWER PROJECT FOR SG-C&I PACKAGE			
TITLE		SCHEME FOR 24 V DC POWER SUPPLY SYSTEM			
REV. NO.	SCALE	DWG. NO.	REV. NO.		
A	A3	0000-405-POI-A-019	A		
APPD	DATE	ARCH.	CLEARED BY		
	28.04.08				
DESIGN	CHKD.	CHKD.	CHKD.		
DESCRIPTION					
A FIRST ISSUE					

This document is the property of NATIONAL THERMAL POWER CORPORATION LTD.
 No part of this document will be reproduced by any means without the written permission.

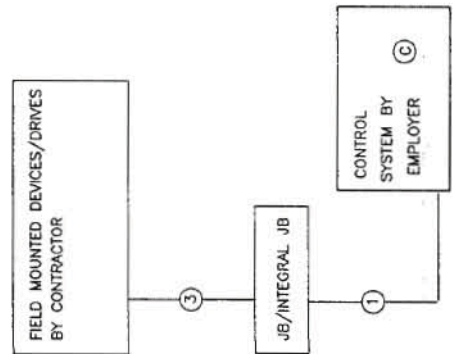
BOTH INSTRUMENTS/DEVICES AND CONTROLS IN CONTRACTOR SCOPE



CONTRACTOR'S RTD & THERMOCOUPLES AND TEMP TRANSMITTERS USED IN CONTRACTOR'S CONTROL SYSTEM



CONTRACTOR'S INSTRUMENTS/DEVICES USED IN EMPLOYER'S CONTROL SYSTEM



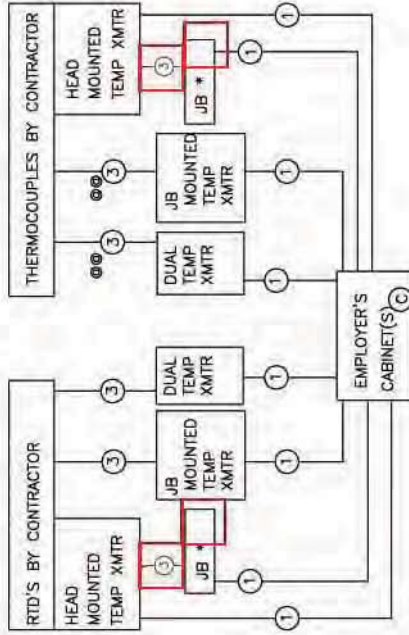
NOTES

- ⊙ --- EMPLOYER'S SCOPE
- --- WHEREVER APPLICABLE
- 1- CABLES IN EMPLOYER'S SCOPE
- 3- CABLES IN CONTRACTOR'S SCOPE
- ⊕ - COMPENSATING CABLES
- ⊕ - SOFT LINKS

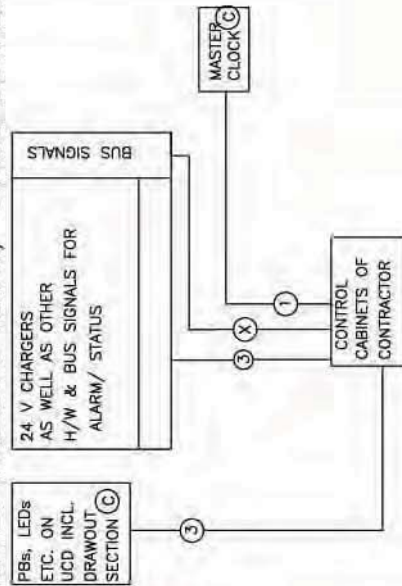
A	DESCRIPTION	M	E	C	CH	ARCH.	DATE
REV. NO.	DRAWN/DESIGN DR/KD.						APPD. DATE
NTPC LIMITED <small>(A GOVERNMENT OF INDIA ENTERPRISE)</small> <small>ENGINEERING DIVISION</small>							
PROJECT							
TYPICAL THERMAL POWER PROJECT							
SG PACKAGE							
TITLE							
INSTRUMENTATION CABLING DIAGRAM							
SIZE	DRG. NO.	SCALE	REV. NO.				
A4	0000-101/102-POI-A-021	NTS	0000-101/102-POI-A-021	REV. NO. A			
			SH 1 OF 4				

This document is the property of NATIONAL THERMAL POWER CORPORATION LTD.
 No part of this document will be reproduced by any means without the written permission.

**CONTRACTOR'S RTD & THERMOCOUPLES AND TEMP TRANSMITTERS
 USED IN EMPLOYER'S CONTROL SYSTEM**



**CONTROL DESK MOUNTED DEVICES AND OTHER MISC
 SIGNALS INCLUDING ALARM/ STATUS SIGNALS ETC.**

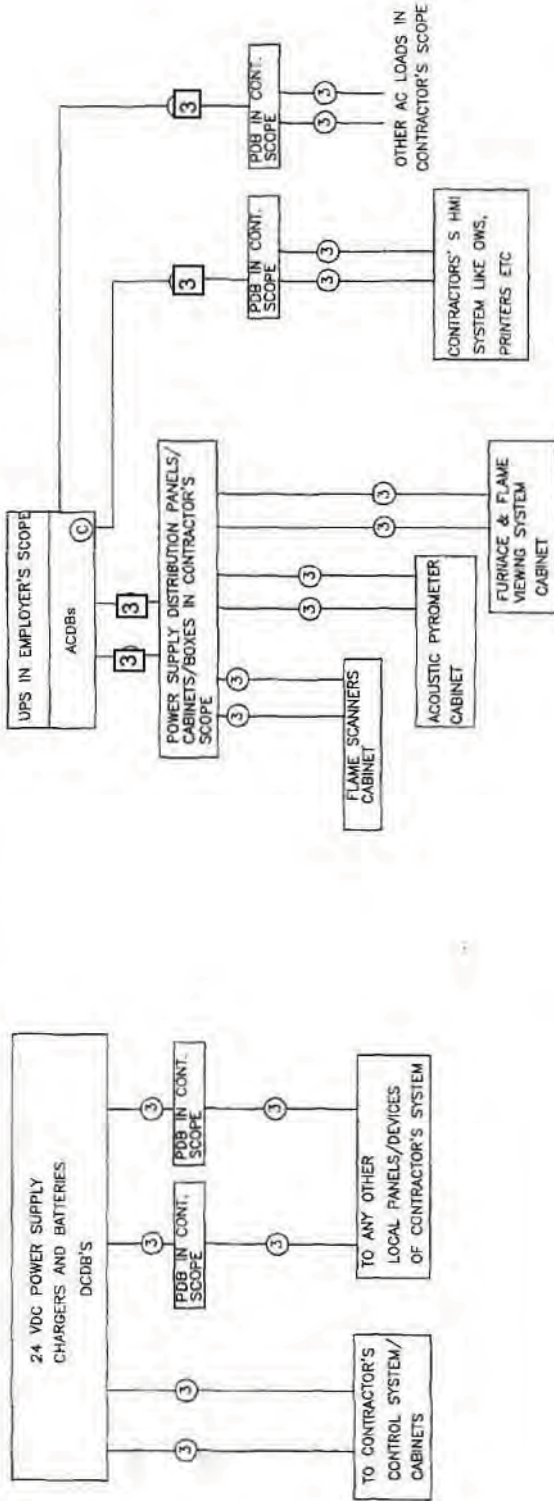


NOTES

- (C) --- EMPLOYER'S SCOPE
- * --- WHEREVER APPLICABLE
- 1- CABLES IN EMPLOYER'S SCOPE
- 3- CABLES IN CONTRACTOR'S SCOPE
- ③③ - COMPENSATING CABLES
- ⊗ --- SOFT LINKS

A	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	(S)	ARCH.	APPD.	DATE	
REV. NO.												
NTPC LTD (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION												
TYPICAL THERMAL POWER PROJECT SG PACKAGE INSTRUMENTATION CABLING DIAGRAM												
SIZE A4	SCALE NTS	DRG. NO. 0000-101/102-POI-A-021	CLEARED BY						REV. NO. A	SH 2 OF 4		

This document is the property of NATIONAL THERMAL POWER CORPORATION LTD.
 No part of this document will be reproduced by any means without the written permission.



NOTES

- (C) --- EMPLOYER'S SCOPE
- --- WHEREVER APPLICABLE
- 1- CABLES IN EMPLOYER'S SCOPE
- 3- CABLES IN CONTRACTOR'S SCOPE
- ⊕ --- COMPENSATING CABLES
- ⊕ --- SOFT LINKS

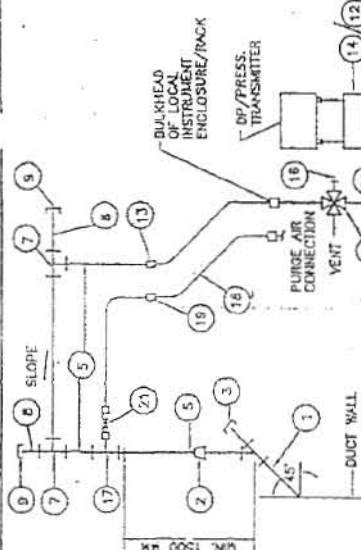
REV. NO.	DESCRIPTION	DATE	BY	CHKD.	APPD.	DATE
NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION						
TYPICAL THERMAL POWER PROJECT SG PACKAGE INSTRUMENTATION CABLING DIAGRAM						
SIZE A4	SCALE NTS	DRG. NO. 0000-101/102-POI-A-021	REV. NO. SH 3 OF 4		REV. NO. A	

LIST OF MATERIALS

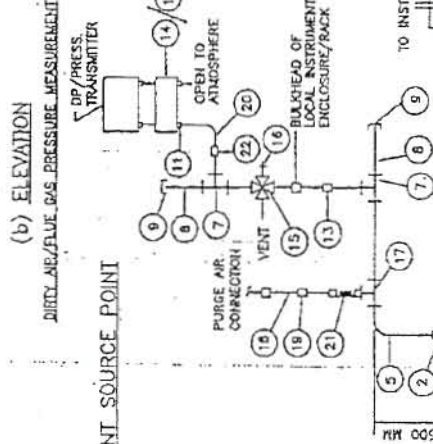
ITEM NO.	DESCRIPTION
1.	42 X 405 MM M.S. BLACK PIPE
2.	M42X2 TO 3/4" REDUCING INSERT
3.	M42X2(F) M.S. CAP
4.	3/4" SW GLOBE VALVE/GATE VALVE
5.	3/4" NPS PIPE
6.	3/4" NPS SW 3/4" NPT(M) CS/AS NIPPLE
7.	3/4" SW EQUAL TEE
8.	3/4" NPS SCH 80 CARBON/ALLOY STEEL NIPPLE
9.	3/4" NPT(F) CS/AS CAP
10.	3/4" SW CS/AS EQUAL CROSS
11.	1/2" TUBE ADAPTER
12.	3 VALVE MANIFOLD
13.	3/4" PIPE UNION
14.	2 VALVE MANIFOLD
15.	3/4" SW 4 WAY VALVE
16.	QUICK DISCONNECT FITTING
17.	3/4" SW 1/2" SW BRANCH TEE
18.	1/2" NB SEAMLESS GI PIPE
19.	1/2" NPT (F) OI FITTING
20.	SS TUBE
21.	FLEXIBLE HOSE WITH ONE END SOCKET WELDED (PIPE SIDE) & OTHER END WITH SUITABLE FITTINGS.
22.	3/4" x 1/2" S.S. TUBE UNION

NOTES:-

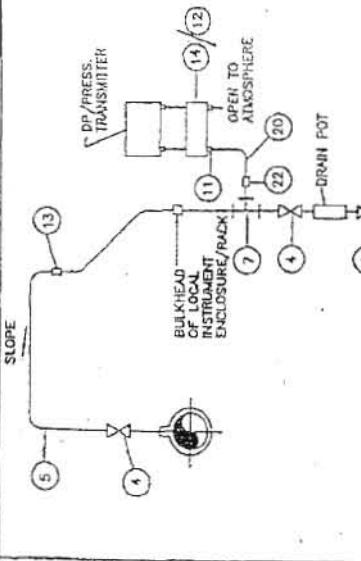
- SEE NOTES UNDER DRG. NO. 0000-101-POI-A-022.
- IMPULSE LINE DRAIN CONNECTIONS SHALL BE DONE AS PER TECHNICAL SPECIFICATIONS
- THE SLOPE IN THE HORIZONTAL OF THE IMPULSE PIPE SHALL BE APPROX. 50 mm/mtr.
- THE EXACT ORIENTATION OF THE TRANSMITTERS WITH RESPECT TO VALVE MANIFOLDS ETC. WILL BE FINALISED DURING DETAILED ENGINEERING KEEPING IN VIEW THE MANUFACTURER'S RECOMMENDATIONS.
- COMMON INSTRUMENT AIR HEADER (1" NB) USING REDUNDANT AIR FILTER REGULATORS WILL BE MADE IN EACH TRANSMITTER ENCLOSURE REQUIRING PURGE AIR. PURGE AIR FOR EACH INSTRUMENT LINE SHALL BE TAPPED FROM THIS HEADER USING INDIVIDUAL PURGE ROTAMETERS AS SHOWN IN DRG. NO. 0000-101-POI-A-034 TYPICALLY.



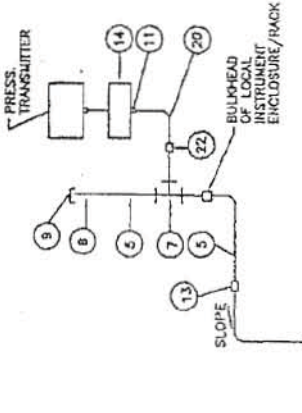
(a) ELEVATION
DIRTY AIR/FLUE GAS PRESSURE MEASUREMENT
TRANSMITTER MOUNTED BELOW INSTRUMENT SOURCE POINT



(b) ELEVATION
DIRTY AIR/FLUE GAS PRESSURE MEASUREMENT
TRANSMITTER MOUNTED ABOVE INSTRUMENT SOURCE POINT



(c) ELEVATION
DIRTY AIR/FLUE GAS PRESSURE MEASUREMENT
TRANSMITTER MOUNTED ABOVE INSTRUMENT SOURCE POINT



(d) ELEVATION
DIRTY AIR/FLUE GAS PRESSURE MEASUREMENT
TRANSMITTER MOUNTED BELOW INSTRUMENT SOURCE POINT

FOR TENDER PURPOSE ONLY

एन टी सी लिमिटेड
NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

TYPICAL THERMAL POWER PROJECT
(SG PACKAGE)

PROJECT	INSTRUMENT INSTALLATION DIAGRAM		
TITLE	(PRESSURE MEASUREMENT USING PRESS./DP TRANSMITTERS) (INST./SERVICE, DIRTY AIR/FLUE GAS)		
SIZE	A3	SCALE	N.T.S.
DRG. NO.	0000-101-POI-A-023		
REV. NO.	A		

CAD FILE NAME: D:\NORTH KARANPURA_3-660MW\0000-102-POI-A-023\RA.DWG

This document is the property of NATIONAL THERMAL POWER CORPORATION LTD. No part of this document will be reproduced by any means without the written permission.