

SITE QUALITY ASSURANCE PLAN (QAP)/FQA

FOR

**CONTROL & INSTRUMENTATION
(BOILER, ST, TG)**

FOR

12 MTPH BOILER AT BHEL JHANSI




**BHARAT HEAVY ELECTRICALS LIMITED
BHEL JHANSI**

DOC. NO.:
REV. NO. :

SITE QUALITY ASSURANCE PLAN (QAP)/FQA OF

CONTROL & INSTRUMENTATION

(BOILER, ST, TG)

PREPARED BY		
APPROVED BY		
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BHARAT HEAVY ELECTRICALS LIMITED
BHEL JHANSI



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		NIL	

SAMPLE



JHANSI

**AUTHORISATION FOR DIFFERENT CATEGORIES / CLASS OF CHECKS
FOR
CONSTRUCTION / ERECTION AND NON - CONFORMITY DISPOSITION**

“BY BHEL”

Categorization/classification	witnessed	Accepting authority	Surveillance by	Non-conformity Disposition Authority
Category - A	QAE	QAE	Head QAE	BHEL JHANSI
Category -B	Erection Engineer	Head Erection	QAE	BHEL JHANSI
Category -C	Erection Engineer	Head Erection	QAE	BHEL JHANSI

BY NTPC

Categorization/classification	witnessed	Accepting authority	Surveillance by NTPC
Category - A	FQA engineer in association with Executing Engineer	FQA engineer in association with Executing Engineer	Head (FQA)
Category -B	Executing Engineer	Executing Engineer	FQA Engineer
Category -C	Executing Engineer	Executing Engineer	Another Executing Engineer authorized by Head(Executing dept.

LEGENDS	QAE	QUALITY ASSURANCE ENGINEER OF BHEL
	Executing Engineer	BHEL JHANSI
	FQA	BHEL JHANSI

NOTE

1	Disposition Authority in A, B & C class of checks shall be as under :
	Product non conformities
	Process / system non conformities
	BHEL JHANSI
	BHEL JHANSI
2	QAE (BHEL) shall witness 'A' category checks. He is also authorized to carry out Surveillance in any of the 'B' and 'C' category of checks at his discretion.
3.	Class of Checks: A- Critical, B-Major, C-Minor. A&B Checks shall be NTPC CHP Stage.
4.	In case of non-conformity , before accepting , accepting authority shall ensure disposition and the same shall be reflected in log-sheet / protocols.
5	Non conformance procedure, apart from above shall be in line with NTPC corporate Quality Assurance coordination procedure.
6	Any ambiguity arising due to dimension & tolerance will be decided in order of preference as : a) Project Drawing b) RFQP c) Instruction Manuals



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STATEMENT OF CHECKS

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Capacity / Type	: 12MTPH COAL FIRED BOILER
System	: CONTROL & INSTRUMENTATION
Sub-System	: CONTROL & INSTRUMENTATION
Area	:

* For checks where log sheets are not called for, suitable records shall be maintained in the form of log book / protocols.

* As an evidence of having carried out the work satisfactorily, a general purpose log sheet L-00 shall be maintained for all the checks.

* Abbreviations used in the column %Type of Check+are :

R : Record Verification

M : Measurement

V : Visual

T/R : Test/Record


V/R : Visual /Record


Sr. No.		Activity & Operation	Characteristics / Instruments	Class Of Check	Type Of Check	Quantum Of Check	Reference Document	Acceptance Norms	Format of Record	Remarks
									*D	
1.0		ACDB / DCDB								
1.1		Foundation dimensions. Tape		B	M	100%	Drawing	Drawing	Log book	
1.2		Ensure proper installation of ACDB / DCDB.		B	V	100%	--	--	--	
1.3		Interconnection between ACDB/DCDB and UPS.		B	V	100%	Drawing	Drawing	--	
1.4		Ensure mounting of all loose instruments on the cabinets.		B	V	100%	Drawing	Drawing	Log book	
1.5		IR value of ACDB / DCDB. Megger		B	T	100%	--	--	Log book	
1.6		Earthing - Megger		B	T	100%	Drawing	Drawing	Log book	
2.0		CONTROL PANEL & CONTROL DESK								
2.1		Foundation dimensions. . Tape		B	M	100%	Drawing	Drawing	Log book	
2.2		Proper positioning, alignment and mounting of loose instruments etc.		B	V	100%	Drawing	Drawing	--	
		MATERIAL RECIPET/STORAGE/ ERECTION					FOR BHEL USE	DOC. NO.:		
SIGNATURE		AREA						REVIEWED BY	APPROVED BY	


Sr. No.		Activity & Operation	Characteristics / Instruments	Class Of Check	Type Of Check	Quantum Of Check	Reference Document	Acceptance Norms	Format of Record	Remarks	
									*D		
2.3			Verticality of panels . Plumb bob	B	V	100%	--	--	--		
2.4			Functioning of panel door for opening, closing and locking purposes.	B	V	100%	--	--	--		
2.5			Segregation of power, control, pre-fabricated and signal cables.	B	V	100%	Drawing	Drawing	--		
2.6			Cable termination and inter-connection between the panels / cabinets / cubicles / control desks / MCC.	B	V	100%	Cable Schedule	Cable Schedule	--		
2.7			Earthing of panels as specified - Megger	B	T	100%	Drawing	Drawing	Log book		
2.8			Wiring as per colour coding scheme. Designation of pre-fabricated cables. Termination of signal cables by maxi-termination / wire wrapping tool.	B	V	100%	Drawing	Drawing	--		
2.9			Shielded cables are earthed at panel end only.	B	V	100%	--	--	--		
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										*D	
2.10			Bottom sealing of panels. Plug unused cable gland holes	B	V	100%	--	--	--		
2.11			Cleanliness.	B	V	100%	--	--	--		
2.12			Ensure all unused slots of electronic racks are properly dummied.	B	V	100%	Drawing	Drawing	Log book		
3.0			PLC PANEL								
3.1			Ensure all the components are installed properly.	B	V	100%	Drawing/ Manual	Drawing/ Manual	Log book		
3.2			Ensure suitable jumpers are provided for proper input voltage.	B	V	100%	Drawing/ Manual	Drawing/ Manual	Log book		
3.3			Ensure earthing of panel.	B	V	100%	Drawing/ Manual	Drawing/ Manual	Log book		
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									*D	
4.0		UPS								
4.1			Foundation dimensions. - Tape	B	M	100%	Drawing	Drawing	Log book	
4.2			Installation of cabinets.	C	V	100%	Drawing	Drawing	--	
4.3			Battery bank installation and connections.	B	V	100%	Drawing	Drawing	Log book	
4.4			Installation of AC Distribution boards.	C	V	100%	Drawing	Drawing	--	
4.5			Interconnections between UPS to AC Distribution boards and battery bank.	B	V	100%	Drawing	Drawing	Log book	
4.6			Mounting of all loose instruments on to the cabinets.	C	V	100%	Schematic Drawing	Schematic Drawing	Log book	
4.7			IR value and earthing. . Megger	B	M	100%	--	--	Log book	
5.0		DAS / DDCMIS								
5.1			Ensure proper installation of peripheral equipments.	C	V	100%	Drawing	Drawing	Log book	
5.2			Ensure proper earthing of equipments. . Megger	B	M	100%	Drawing	Drawing	Log book	
5.3			Ensure proper UPS power distribution between the power distribution cabinets and peripherals.	C	V	100%	Drawing	Drawing	Log book	
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									*D	
5.4		Ensure proper live and neutral connection for all the peripherals.	C	V	100%	Drawing	Drawing	Log book		
5.5		Ensure neutral to earth voltage is less than 2 V - Multimeter	C	M	100%	Drawing	Drawing	Log book		
5.6		Ensure all unused slots on the electronic rack are dummied.	C	V	100%	Drawing	Drawing	Log book		
5.7		Ensure proper termination of intra-plant bus.	C	V	100%	Drawing	Drawing	Log book		
5.8		Ensure proper termination of Ethernet cables	C	V	100%	Drawing	Drawing	Log book		
5.9		Ensure Electronic Earth - Megger	B	M	100%	Drawing	Drawing	Log book		
510		Ensure proper termination full from signals on Max DNA rack for video process control operation	C	V	100%	Drawing	Drawing	Log book		
5.11		Ensure proper settings of console and printer for on-line operation.	C	V	100%	Drawing	Drawing	Log book		
5.12		Ensure availability of system / project specific application software on the hard disk.	B	V	100%	Drawing	Drawing	Log book		
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									*D		
6.0		SIGNAL CABLES									
6.1		Ensure specified cables are used as per application.	C	V	100%	Drawings	Drawings	--			
6.2		IR value and continuity of cables.	B	M	100%	--	--	Log book			
6.3		Earthing of screened cables at panel end.	C	V	100%	Drawings	Drawings	Log book			
6.4		Identification, Glanding, dressing at panel end, junction box and at field device end.	C	V	100%	Cable schedule	Cable schedule	Log book			
6.5		Ensure provision of electronic earth.	C	M	100%	--	--	Log book			
6.6		Screening for individual and overall pairs.	B	V	100%	--	--	--			
6.7		Ensure no shorting between the pins and continuity for pre-fabricated cables.	C	V	100%	--	--	--			
7.0		CABLE TRAYS & RACKS									
7.1		Material of the trays conforms to the requirement.	C	V	100%	Drawing	Drawing	--			
7.2		Dimensions of the trays.		V	100%	Drawing	Drawing	Log book			
7.3		Provision of correct size of ladder / perforated trays	C	V	100%	Drawing	Drawing	--			
7.4		Identification and marking for Instrument, Power and Control cables.	B	V	100%	--	--	Log book			
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8.0		ELECTRICAL ACTUATOR								
8.1		Name plate details, type of actuator and mounting.	B	V	100%	O & M Manual	O & M Manual	Log book		
8.2		Electrical connections.	B	V	100%	Drawing	Drawing	--		
8.3		I.R value of motor- Megger	B	M	100%	--	--	Log book		
8.4		Type / size of cable glands and conduit.	B	V	100%	Cable Schedule	Cable Schedule	--		
8.5		Sealing of cable entries.	B	V	100%	--	--	--		
8.6		Termination of control and power cables.	B	V	100%	Drawing	Drawing	--		
8.7		Starter / push button connections.	B	V	100%	Drawing	Drawing	--		
8.8		Proper matching of actuator flange with the valve flange.	B	V	100%	--	--	--		
8.9		Tightening of all fasteners.	B	V	100%	--	--	--		
8.10		Earthing . Megger	B	T	100%	Drawing	Drawing	Log book		
9.0		PNEUMATIC ACTUATOR								
9.1		Name plate details, type and mounting.	B	V	100%	O & M Manual	O & M Manual	Log book		
9.2		Supply & signal air connection, quality of air, and setting of Air Filter Regulator.	B	V	100%	Drawing	Drawing	Log book		
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									*D		
9.3		Mounting of I/P converter, PFT, solenoid valve assembly and air lock relays if received separately.	B	V	100%	Drawing	Drawing	Log book			
9.4		Copper tubing, and ensure there is no leakage from air connections.	B	V	100%	Drawing	Drawing	Log book			
9.5		Proper glanding and termination of Signal cables.	B	V	100%	Cable schedule	Cable schedule	Log book			
9.6		Check manual operation to ensure smooth open / close functions.	B	V	100%	Inst. Manual	Inst. Manual	Log book			
10.0		CONTROL VALVES									
10.1		Ensure Valves are always installed in a straight run of the main line and away from pipe bends and sections of abnormal velocity.	C	V	100%	Drawing	Drawing	Log book			
10.2		Maintain Direction of flow.	C	V	100%	Drawing	Drawing	Log book			
10.3		Tightness of packing flange nuts for optimum pressure on valve stem and packing box walls.	C	V	100%	--	--	Log book			
10.4		Ensure no leakage from the airlines to the actuator.	C	V	100%	--	--	Log book			
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									*D	
10.5		Air supply pressure setting as per the control valve requirement.	C	V	100%	Drawing	Drawing	Log book		
10.6		Mounting of position feedback transmitter, limit switch.	C	V	100%	--	--	--		
10.7		Operation of controller and valve for full open & close position. Ensure desired direction of valve movement.	B	V	100%	Drawing	Drawing	Log book		
11.0		INDICATORS & RECORDERS								
11.1		Mounting as per drawing.	C	V	100%	Drawing	Drawing	--		
11.2		Ensure supply voltage and input signal as per drawing- Multimeter	C	M	100%	Drawing	Drawing	Log book		
11.3		Ensure free movement & correct speed of chart / pointer.	C	V	100%	--	--	--		
11.4		Earthing of instrument casing/body. Megger	C	T	100%	Drawing	Drawing	--		
11.5		Firmly secure the mounting lugs and bolts.	C	V	100%	--	--	--		
11.6		Ensure compensating cable leads do not have any loops and are connected with correct polarity.	C	V	100%	--	--	Log book		
11.7		Ensure signal cables are separated from power cables.	C	V	100%	Schematics	Schematics	--		
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12.0		FLOW METERS							
12.1		Identification of the instrument for correct range, tag number, tapping point and end connections conforming to requirement.	C	V	100%	Drawing/Inst. Schedule	Drawing/Inst. Schedule	Log book	
12.2		Functional checking of instrument by feeding input signal and comparing the output. Master Instrument. Setting at specified values for alarm, trip etc.	B	M	100%	Drawing/Inst. Schedule	Drawing/Inst. Schedule	L - 01	
12.3		Ensure correct direction of flow.	C	V	100%	Drawing	Drawing		
12.4		Ensure straight length of pipe in upstream and downstream. Tape	B	M	100%	---	--	Log book	
12.5		Cleanliness of lines.	C	V	100%	--	--	Log book	
12.6		Ensure low and high tapings are connected correctly.	B	V	100%	Drawing	Drawing	Log book	
12.7		Earthing of enclosure.	C	V	100%	--	--	Log book	
12.8		Cable glanding and termination.	C	V	100%	Drawing/Inst. Schedule	Drawing/Inst. Schedule	Log book	
12.9		Power supply with correct polarity.	C	V	100%	Drawing	Drawing	--	
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									*D	
13.0		FLOW NOZZLE / ORIFICE PLATE								
13.1		Number, location and size of tapings.	C	V	100%	Drawing	Drawing	--		
13.2		Dimensions of orifice / nozzle. Micrometer	C	M	100%	Drawing	Drawing	Log book		
13.3		Concentricity with main line.	C	V	100%	--	--	--		
13.4		Ensure tapings are cleaned and are free from choking.	C	V	100%	--	--	--		
13.5		Ensure correct direction of flow. Water level	B	M	100%	Drawing	Drawing	--		
13.6		Maintain proper gradient of impulse lines.	B	V	100%	Drawing	Drawing	Log book		
13.7		Purging of impulse lines before connecting.	C	D	100%	--	--	Log book		
13.8		Welding and NDE of Flow Nozzle.	A	V	100%	FWS/ NDE Manual	FWS/ NDE Manual	Log book		
13.9		Ensure no leakage from weld joints.	B	V	100%	--	--	Log book		
13.10		Ensure straight length of pipe up steam and down steam of Flow Nozzle / Orifice Plate. Tape	C		100%	Drawing & Specification	Drawing & Specification	Log book		
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									*D			
14.0			GAUGES OF ALL TYPES									
1			Identification of the instrument for type, range, tag number, tapping point and end connections.	C	V	100%	Drawing	Drawing	Log book			
2			Ensure tightening of fasteners.	C	V	100%	- Do -	- Do -	Log book			
3			Ensure the DP gauges are mounted as detailed below: a) For water and steam path, they are mounted below the tapping points. b) For air & flue gas path, they are mounted above the tapping points.	C	V	100%	- Do -	- Do -	Log book			
4			Piping connections to the gauges are clean and free from strains.	C	V	100%	- Do -	- Do -	Log book			
5			For differential pressure gauges (DP), ensure that the line with higher static pressure is connected to the connection marked HIGH or \neq and the line with lower static pressure to connection marked LOW or $q\pm$	C	V	100%	- Do -	- Do -	Log book			
6			Calibration and setting of the gauges as applicable . Master Instrument	B	M	100%	Installation Manual	Installation Manual	Log book			
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									*D	
		I / P CONVERTOR								
1		Identification of instrument for type / range / tag No. / tapping points & end connection.	C	V	100%	Drawing				
2		Proper mounting of the instrument and tightening of all fasteners.	C	V	100%	- Do -	- Do -	Log book		
3		Calibration . Multimeter	B	M	100%	- Do -	- Do -	Log book		
4		Working of the instrument for its specified accuracy. . Master Instrument	B	M	100%	Installation manual	Installation manual	L- 01		
5		Instrument earthing. . Megger	B	M	100%	Drawing	Drawing	Log book		
6		Leak proof-ness of fittings, using soap solution.	B	V	100%	O & M Manual	O & M Manual	Log book		
7		Polarity of input signal. . Multimeter	C	M	100%	- Do -	- Do -	Log book		
8		AFR to be set as per requirement. . Pressure gauge	B	M	100%	- Do -	- Do -	Log book		
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									*D	
1		THERMO COUPLE & RTD Identification of the thermocouples w.r.t type (grounded / ungrounded and dual / single element), range, tag number, tapping point and connection conform to the requirement.	B	V	100%	Drawing	Drawing	Log book		
2		Calibration of characteristics of Temperature Elements (TE) / healthiness. . Milliamps / Resistance Calibrator	B	M	100%	O & M manual	O & M manual	L- 01		
3		Mounting of thermocouples and tightening of fasteners.	C	V	100%	Drawing	Drawing	Log book		
4		Continuity and IR value. . Multimeter / Megger	C	M	100%	Drawing / O & M Manual	Drawing / O & M Manual	Log book		
5		Earthing of thermocouples as applicable. . Megger	C	M	100%	- Do -	- Do -	Log book		
6		Routing of compensating cable is free form interference of strong electrical fields.	C		100%	Drawing	Drawing	Log book		
7		Seal welding after installation of thermocouple / RTD thermowell.	C		100%	- Do -	- Do -	Log book		
8		Stubs are provided as per requirement.	C		100%	Drawing	Drawing	Log book		
9		Right type of compensating cable.	C		100%	- Do -	- Do -	Log book		
10		Polarity of connection.	C		100%	- Do -	- Do -	Log book		
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SOLENOID VALVES										
1		Ensure proper direction of flow.	C	V	100%	O & M Manual	O & M Manual	Log book		
2		Setting of air pressure, ensuring supply of dry instrument air. . Pressure gauge	B	M	100%	Cable Schedule	Cable Schedule	Log book		
3		Type, size of cable glands and cable termination.	C	V	100%			Log book		
4		Sealing of cable entries.	C	V	100%	O & M Manual	O & M Manual	Log book		
5		IR value and resistance value.	B	M	100%	- Do -	- Do -	Log book		
6		Supply voltage	C	M	100%	- Do -	- Do -	Log book		
7		Fixing of identification tag numbers.	C	V	100%			Log book		
SWITCHES OF ALL TYPES										
1		Identification of the switches with respect to type, rating, range, tag no., tapping point and end connection conforms to requirement.	C	V	100%	Drawing	Drawing	Log book		
2		Mercury bulb switches are always mounted vertically if applicable.	C	V	100%			Log book		
3		Tightness of terminal connections.	C	V	100%	O&M Manual	O&M Manual	Log book		
4		Impulse pipelines are cleaned with compressed air and joints are leak proof.	C	V	100%	Drawing	Drawing	Log book		
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5			Gradient of pipelines. . Water level	C	M	100%	- Do -	- Do -	Log book	
6			Line connection does not transmit strain to the switch.	C	V	100%	- Do -	- Do -	Log book	
7			Type and size of cable gland / conduit used.	C	V	100%	- Do -	- Do -	Log book	
8			For differential applications, the line with higher static pressure is connected to the connection marked HIGH or % and the line with lower static pressure to connection marked LOW or %.	B	V	100%	- Do -	- Do -	Log book	
9			Electrical connections to the switch / micro switch.	C	V	100%	Drawing	Drawing	Log book	
10			Free movement of mercury switches by manual tilting.	C	V	100%	O&M Manual	O&M Manual	Log book	
11			Change over of contacts by actuating the micro switches.	B	V	100%	Drawing	Drawing	Log book	
12			IR value and continuity- Megger/Multi meter.			100%	O&M Manual	O&M Manual	Log book	
13			Check thermo well installation as per requirement.	C	V	100%	Drawing	Drawing	Log book	
14			Ensure proper earthing, wherever applicable- Megger.	C	M	100%	- Do -	- Do -	Log book	
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1		TRANSDUCERS Identification of the transducers with respect to type, range, tag no., tapping point and end connections conforms to the requirement.	C	V	100%	Drawing	Drawing	Log book		
2		Earthing connection. - Megger	B	M	100%	- Do -	- Do -	Log book		
3		Power supply input. - Multimeter	C	M	100%	O & M Manual / Schematic Drawing	O & Manual / Schematic Drawing	Log book		
4		Ensure cleanliness of Impulse piping.	B	V	100%	Drawing	Drawing	Log book		
5		Slope of impulse pipe. . Water level	C	M	100%	- Do -	- Do -	Log book		
6		Calibration and setting of transducers. . Master instruments.	B	M	100%	Procedure / O & M Manual	Procedure / O & M Manual	Log book		
7		Fixing of identification tag numbers.	C	V	100%	Instrument Schedule/DRG	Instrument Schedule/DRG	Log book		
8		Routing of signal cables with tag numbers.	C	V	100%	Drawing/Cable Schedule	Drawing/Cable Schedule	Log book		
9		Ensure proper phase sequence / polarity of the input signals. . Multimeter	B	M	100%	Cable Schedule	Cable Schedule	Log book		
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		TRANSMITTERS										
1		Identification of the transmitters with respect to type, range, tag no., tapping point and end connections conforms to the requirement.		C	V	100%	Drawing	Drawing	Log book			
2		Proper mounting of instrument and tightening of all fasteners.		C	V	100%	- Do -	- Do -	Log book			
3		Earthing of instruments and hosepipe carrying the cables.		C	M	100%	- Do -	- Do -	Log book			
4		Routing of impulse pipelines and gradient.		C	M	100%	- Do -	- Do -	Log book			
5		The line with higher static pressure is connected to connection marked high or % \pm % and the line lower static pressure to connection marked LOW or % \circ % \circ		B	V	100%	O & M Manual	O & M Manual	Log book			
6		Supply voltage with correct polarity / air supply availability.		C	M	100%	Drawing / O & M Manual	Drawing / O & M Manual	Log book			
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		IMPULSE PIPING, TUBING & FITTINGS									
1		Material, size, pressure rating and IBR certification wherever applicable.	C	V/R	100%	Drawing	Drawing	Log book			
2		Proper thread formation.	C	V	100%	-Do-	- Do -	Log book			
3		Capping of open ends to keep out foreign particles.	C	V	100%	- Do -	- Do -	Log book			
4		Routing, installation and clamping.	C	V	100%	- Do -	- Do -	Log book			
5		Ensure piping is not routed above or below the equipment-removal areas, monorails, removable gratings, and cable trays.	C	V	100%	- Do -	- Do -	Log book			
6		Maintain proper gradient / slope. . Water level	C	M	100%	- Do -	- Do -	Log book			
7		Blow down of lines.	C	V	100%	--	--	Log book			
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8.0		Welding of Impulse Piping								
8.1		Qualification of welders prior to start of welding.	A	V / R	100%	Welding Manual	Welding Manual	Test Report		
8.2		Ensure adoption of correct procedure / method, and use of approved electrodes during welding.	A	V / R	100%	Drawing/FWS, Welding Manual	Drawing/FWS, Welding Manual	Log book		
8.3		Preheating of joints, heating during welding, and post weld heating of welds (as applicable).	B	V / R	100%	FWS / Heat Treatment Manual	FWS / Heat Treatment Manual	Log book / H. T. Report		
8.4		NDE on impulse piping welds								
8.4.1		Visual Inspection of welds.	A	V	100%	--	--	Log book		
8.4.2		LPI / MPI on low pressure lines	B	T	02%	Drawing / FWS / NDT Manual	Drawing / FWS / NDT Manual	Logbook/ Test Report		
8.4.2		LPI / MPI on high-pressure lines. - Where, hydrostatic test is performed.	B	T	10%	Drawing / FWS / NDT Manual	Drawing / FWS / NDT Manual	Logbook/ Test Report		
9		- Where, hydrostatic test is not performed. Hydrostatic testing of the lines, where 10% LPI / MPI is performed.	A	V	100%	Drawing	Drawing	Log book		
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		ANALYZERS							
1		Location and proper mounting instrument.	B	V	100%	Drawing	Drawing	Log book	
2		Protection of instrument against cold, heat radiation and vibrations.	B	V	100%	O & M Manual	O & M Manual	Log book	
3		Connection of pipelines and gradient. . Water level	C	M	100%	Drawing	Drawing	Log book	
4		Hydraulic test of impulse pipe lines. . Pressure gauge	B	M	100%	Drawing / O & M Manual	Drawing / O & M Manual	Log book	
5		Power supply as required. . Multimeter	C	M	100%	- Do -	- Do -	Log book	
6		Earthing. . Megger	B	M	100%	- Do -	- Do -	Log book	
7		Working of the instrument for its specified accuracy. . Master Instrument	B	M	100%	O & M Manual / Procedure	O & M Manual / Procedure	L . 01	
8		Gas entering the measuring cell is at specified pressure and temperature. . Master Instrument	B	M	100%	O & M Manual	O & M Manual	Log book	
9		Regulation of sample gas flow.	B	M	100%	Installation Manual	Installation Manual	Log book	
10		Calibration with standard gas. . Lab instruments	B	M	100%			Log book	
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11		Flue gas O2 analyzer. a) Probe and electronics installation.	C	V	100%	Installation Manual / Catalogue	Installation Manual / Catalogue	Log book			
		b) Start up and calibration wherever applicable. . Lab instruments	B	M	100%	Specifications / Data Sheets	Specifications / Data Sheets	Log book			
12		Flue gas CO analyzer. a) Installation of probe, panel and transmitter Indicator.	B	V	100%	Installation Manual / Catalogue	Installation Manual / Catalogue	Log book			
		ANALYSER (pH CONDUCTIVITY)									
1		Location	C	V	100%	Drawing	Drawing	Log book			
2		All electronic cards are in position	C	V	100%	Drawing / O & M Manual	Drawing / O & M Manual	Log book			
3		Hydraulic test of impulse piping	B	V	100%	- Do -	- Do -	Log book			
4		Earthing . Megger	B	M	100%	- Do -	- Do -	Log book			
5		Verification of calibration report.	B	R	100%			Log book			
6		Power supply as per requirement . Multimeter	C	M	100%	- Do -	- Do -	Log book			
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7		Fluid entering the measuring cell is at specified pressure and temperature. . Pressure gauge	B	M	100%	- Do -	- Do -	Log book			
8		Healthiness and proper operation of valves and other equipment.	B	V	100%	- Do -	- Do -	Log book			
9		Healthiness and proper operation of all the electronic cards with equipments.	B	V	100%	- Do -	- Do -	Log book			
		PUMP & HEATER PANEL									
1		Calibration of the pressure switches in the P & H Panel. . Pressure Gauge	B	M	100%	O & M Manual	O & M Manual	Log book			
2		Calibration of the temperature sensor in the P & H Panel. . Thermometer	B	M	100%	- Do -	- Do -	Log book			
		SWAS									
1		Installation	B	V	100%	Installation Drawings / SWAS Room Layout Drawing	Installation Drawings / SWAS Room Layout Drawing	Log book			
2		Pipeline connection	B	V	100%			Log book			
3		External connection like power & control.	B	V	100%	Cable Schedule	Cable Schedule	Log book			
4		Earthing . Megger	B	M	100%	Installation Manual / Specifications / Date sheets	Installation Manual / Specifications / Date sheets	Log book			
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1		FLAME SENSING SYSTEM Flame scanner for the respective elevation and corner is to be mounted at the proper location.	C	V	100%	Drawing	Drawing	Log book		
2		All the Mechanical components like flame scanner, guide pipe assembly, flame scanner head assembly to be installed as per Instruction Manual.	C	V	100%	- Do -	- Do -	Log book		
3		All the electrical components like power supply modules, Transmitter modules, 2/4 summing modules, individual output module, flame scanner test module, distributor module, master timer module, check timer module, timer synchronizer fault module will be installed in the FSSS panel itself.	C	V	100%	- Do -	- Do -	Log book		
4		Cooling air arrangement for scanner assembly to be installed.	C	V	100%	- Do -	- Do -	Log book		
5		Ensure interconnection between modules, scanner assembly etc.	C	V	100%	- Do -	- Do -	Log book		
6		Disconnect power supply before connecting wire to prevent electrical shock and equipment damage.	C	V	100%	- Do -	-Do -	Log book		
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7		Ensure proper installation of scanner / scanner panel.	B	V	100%	Drawing	Drawing	Log book		
8		Ensure availability of proper operating voltage and set the same if required. . Multimeter	C	M	100%	- Do -	- Do -	Log book		
9		Ensure installation of all loose supplied cards.	C	V	100%	- Do -	- Do -	Log book		
10		Ensure number of input signals and type of signals conforms to the requirement.	B	V	100%	O & M manual	O & M manual	Log book		
11		Ensure proper cable size and termination	C	V	100%	Drawing	Drawing	Log book		
12		Continuity and I.R value.	B	M	100%	- Do -	- Do -	Log book		
13		Switch on the supply and check output by simulating input.	B	M	100%	O & M Manual	O & M Manual	Log book		
14		Set the alarm set point for its value and check for proper operation.	B	V	100%	- Do -	- Do -	Log book		
15		Ensure adequate cooling air.	B	V	100%			Log book		
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		E W L I (Electronic Water Level Indicator)								
		PANEL:								
1		Foundation dimension. . Tape	B	M	100%	Drawing	Drawing	Log book		
2		Name plate details	C	V	100%	- Do -	- Do -	Log book		
3		Location of the assertor panel away from heat zone.	C	V	100%	- Do -	- Do -	Log book		
4		Proper positioning, alignment and mounting of all instruments.	B	V	100%	- Do -	- Do -	Log book		
5		Segregation of power, control and signal cables.	C	V	100%	Cable Schedule	Cable Schedule	Log book		
6		Cable size, termination and interconnections between panels and pressure vessel.	C	V	100%	Drawing	Drawing	Log book		
7		Wiring as per colour coding scheme.	C	V	100%	- Do -	- Do -	Log book		
8		Cut out dimension of display in U C B. . Tape	C	M	100%	- Do -	- Do -	Log book		
9		Earthing . Megger	C	M	100%	Drawing	Drawing	Log book		
10		Sealing of cable entries	B	V	100%	Drawing	Drawing	Log book		
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1		PRESSURE VESSEL: Installation of pressure vessel and piping with proper slope.	B	M	100%	Drawing	Drawing			
2		Insulation of water line and corresponding valves only.	C	V	100%	- Do -	- Do -			Log book
3		Ensure pressure vessel and steam lines are not insulated.	B	V	100%	- Do -	- Do -			Log book
4		Flushing of pressure vessel before electrode mounting.	B	V	100%	- Do -	- Do -			Log book
5		Mounting of electrode with special torque wrench. Do not exceed torque values specified.	B	V	100%	- Do -	- Do -			Log book
6		Ensure root valves and isolating valves are mounted in horizontal plane.	B	V	100%	- Do -	- Do -			Log book
7		Ensure verticality of vessels. Also, ensure verticality of electrodes with reference to vessel.	B	V	100%					Log book
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		FSSS								
1		Panel should be lifted by means of ropes only	C	V	100%			Log book		
2		Panel shall be kept over the foundation pockets and the foundation bolts shall be fixed from inside the panels by removing bottom gland plate.	C	V	100%			Log book		
3		Bottom gland plate shall be drilled and cable gland shall be mounted.	C	V	100%			Log book		
4		Ensure mounting of Console insert on customer's console.	C	V	100%			Log book		
5		Ensure Cable interconnection between FSSS and console insert, FSSS and Mill panel, FSSS and secondary air panel, FSSS panel and Field Equipment.	C	V	100%			Log book		
6		Ensure mounting of annunciation instruments coming in the panel	C	V	100%			Log book		
7		Ensure Control panel is earthed by means of copper conductor.	B	V	100%			Log book		
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1		GRAVIMETRIC FEEDER Installation of equipments including flexible connections above and below the feeders.	B	V	100%	Drawing	Drawing	Log book		
2		Mounting of loose instruments and PCBs.	B	V	100%	Schematic Drawings	Schematic Drawings	Log book		
3		Refilling of fresh lubricant including gearbox.	C	V	100%	O & M Manual	O & M Manual	Log book		
4		Tightness of all fasteners.	B	V	100%			Log book		
5		Ensure all the electrical connections are made as per requirement.	C	V	100%	Schematic Drawings	Schematic Drawings	Log book		
6		Installation of ultrasonic coal flow detector and all necessary connections.	B	V	100%	Drawing	Drawing	Log book		
7		Connection of demand signal to feeder speed control.	C	V	100%	- Do -	- Do -	Log book		
8		Ensure no foreign materials in the belt and clean out conveyor area.	B	V	100%			Log book		
9		Power, Control & signal cabling between power & local feeder cabinets.	B	V		Cable Schedule	Cable Schedule			
10		IR value of all cables - Megger	B	M						
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Sr. No.	Activity & Operation	Characteristics / Instruments	Class Of Check	Type Of Check	Quantum Of Check	Reference Document	Acceptance Norms	Format of Record		Remarks
									*D	
1		OPACITY MONITOR FLANGES: Ensure before installation of source / receiver units that the serial numbers of both of them are same.	C	V	100%	Operating Manual	Operating Manual	Log book		
2		Ensure that the flanges are mounted as per the guidelines of Manufacturer's manual.	C	V	100%	- Do -	- Do -	Log book		
3		Ensure that the level of flanges (Zero level) . . Water level	C	M	100%	- Do -	- Do -	Log book		
4		Ensure that the center of flanges is in one line. . Piano wire	C	M	100%	- Do -	- Do -	Log book		
5		Ensure that the axis of flanges is precisely aligned to each other. . Water level / Tape	C	M	100%	- Do -	- Do -	Log book		
6		Ensure that the +TOP+marking on the flanges is on top before installation.	C	V	100%	- Do -	- Do -	Log book		
7		Ensure that the gusset plates are mounted as per the guidelines of Manufacturer's manual, if applicable.	C	V	100%	- Do -	- Do -	Log book		
8		Ensure that full welding is completed on the flanges.	C	V	100%	- Do -	- Do -	Log book		
9		Ensure that the spring washers are inserted properly as per the guidelines of Manufacturer's manual.	C	V	100%	Operating Manual	Operating Manual	Log book		
						FOR BHEL USE	DOC. NO.:			
SIGNATURE						MATERIAL RECIPET/STORAGE/ ERECTION				
AREA								REVIEWED BY		APPROVED BY

SUPPLIER'S NAME & ADDRESS		FIELD QUALITY PLAN					PROJECT:, BHEL JHANSI			
 BHEL JHANSI		SYSTEM: CONTROL & INSTRUMENTATION			Doc No.:		PACKAGE :			
		SUB-SYSTEM:			Rev No.:		CONTRACT NO.:			
					Date:		CONTRACTOR :			
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Sr. No.	Activity & Operation	Characteristics / Instruments	Class Of Check	Type Of Check	Quantum Of Check	Reference Document	Acceptance Norms	Format of Record		Remarks
									*D	
1		PURGE UNIT: Ensure that the purge unit is properly mounted as per the guidelines of Manufacturer's manual.	C	V	100%	Operating Manual	Operating Manual	Log book		
2		Ensure provision of weather hood.	C	V	100%	- Do -	- Do -	Log book		
1		PURGE METER: Identification of the meter for type, range, tag number, tapping point and end connections.	C	V	100%	Drawing	Drawing	Log book		
2		Ensure proper mounting and orientation of the meter.	C	V	100%	- Do -	- Do -	Log book		
3		Ensure proper incoming and outgoing connections.	C	V	100%	- Do -	- Do -	Log book		
4		Ensure free float movement.	C	V	100%	O & M Manual	O & M Manual	Log book		
5		Calibration and setting of the meter. - Master Instrument	B	M	100%	Calibration Procedure / O & M Manual	Calibration Procedure / O & M Manual	L- 01		
6		Blowing of the meter with instrument air.	B	V	100%	O & M Manual	O & M Manual	Log book		
		MATERIAL RECIPET/STORAGE/ ERECTION				FOR BHEL USE	DOC. NO.:			
SIGNATURE		AREA					REVIEWED BY	APPROVED BY		

SUPPLIER'S NAME & ADDRESS		FIELD QUALITY PLAN					PROJECT:, BHEL JHANSI			
 BHEL JHANSI		SYSTEM: CONTROL & INSTRUMENTATION			Doc No.:		PACKAGE :			
		SUB-SYSTEM:			Rev No.: 01		CONTRACT NO.:			
					Date: Page: 33 OF 35		CONTRACTOR :			
Sr. No.	Activity & Operation	Characteristics / Instruments	Class Of Check	Type Of Check	Quantum Of Check	Reference Document	Acceptance Norms	Format of Record		Remarks
									*D	
		TURBO SUPERVISORY SYSTEM DISPLACEMENT TRANSDUCERS (TURBINE EXPANSION, AXIAL SHAFT)								
1		Type of transducer, mechanical healthiness (no physical damage).	C	V	100%	Project Specific Manual/ DRG	Project Specific Manual/ DRG	Log book		
2		Resistance of coils - Multimeter	C	M	100%	Project Specific O & M Manual	Project Specific O & M Manual	Log book		
3		Mounting	C	M	100%	Project Specific O & M Manual	Project Specific O & M Manual	Log book		
3.1		Gap between two coils . Vernier / Slip gauge	C	M	100%	- Do -	- Do -	Log book		
3.2		Parallelism of coils with measuring surface . Vernier / Slip gauge	C	M	100%	- Do -	- Do -	Log book		
3.3		Parallelism of the coils	C	M	100%	- Do -	- Do -	Log book		
3.4		Safety gaps	C	V	100%	- Do -	- Do -	Log book		
3.5		Sliding movement.	C		100%	- Do -	- Do -	Log book		
4		Cabling from panel to local junction box	C	V	100%	Cable Schedule	Cable Schedule	Log book		
5		Routing and termination of transducer cables in local junction box.	C	V	100%	- Do -	- Do -	Log book		
6		Tightening and locking of all the bolts	C	V	100%	Drawing	Drawing	Log book		
7		Doweling of transducer.	B	V	100%	- Do -	- Do -	Log book		
		MATERIAL RECIPET/STORAGE/ ERECTION				FOR BHEL USE	DOC. NO.: -			
SIGNATURE		AREA					REVIEWED BY	APPROVED BY		

SUPPLIER'S NAME & ADDRESS		FIELD QUALITY PLAN					PROJECT:, BHEL JHANSI			
 BHEL JHANSI		SYSTEM: CONTROL & INSTRUMENTATION			Doc No.:		PACKAGE :			
		SUB-SYSTEM:			Rev No.: 01		CONTRACT NO.:			
					Date: Page: 34 OF 35		CONTRACTOR :			
Sr. No.	Activity & Operation	Characteristics / Instruments	Class Of Check	Type Of Check	Quantum Of Check	Reference Document	Acceptance Norms	Format of Record		Remarks
									*D	
1		EXPANSION PICK UP Type and range of input & output of the pickups.	B	V	100%	Project Specific O & M Manual	Project Specific O & M Manual	Log book		
2		Ensure sensor is mounted perpendicular to the shaft and distance between sensor and shaft as per drawing.	C	V	100%	Drawing	Drawing	Log book		
3		Distance between lower part of the sensor shell and the casing wall. . Vernier slip gauge	B	M	100%	- Do -	- Do -	Log book		
4		MICS / Screened cables are fastened to turbine casing with at least two clamps.	B	V	100%	- Do -	- Do -	Log book		
5		The centerline of the sensor bracket coincides with the symmetry line of the collar of the double cone.	B	V	100%	- Do -	- Do -	Log book		
6		Check connections between sensors and PROXIMETERS as per requirement.	B	V	100%	- Do -	- Do -	Log book		
7		Ensure correct supply voltage for sensors as per requirement. . Multimeter.	C	M		Drawing / O & M Manual	Drawing / O & M Manual	Log book		
		MATERIAL RECIPET/STORAGE/ ERECTION			FOR BHEL USE					
SIGNATURE		AREA					REVIEWED BY		APPROVED BY	

SUPPLIER'S NAME & ADDRESS		FIELD QUALITY PLAN					PROJECT:, BHEL JHANSI			
 BHEL JHANSI		SYSTEM: CONTROL & INSTRUMENTATION			Doc No.:		PACKAGE CONTRACT NO.: CONTRACTOR :			
		SUB-SYSTEM:			Rev No.:					
		Date: Page: 35 OF 35								
Sr. No.	Activity & Operation	Characteristics / Instruments	Class Of Check	Type Of Check	Quantum Of Check	Reference Document	Acceptance Norms	Format of Record		Remarks
									*D	
1		VIBRATION PICK-UP Type of pick up.	C	V	100%	Drawing / O & M Manual	Drawing / O & M Manual	Log book		
2		Ensure no cracks on the body and damage to the mounting surface.	B	V	100%	O & M Manual	O & M Manual	Log book		
3		Ensure minimum 80% surface contact where pick up is mounted.	B	V	100%	Drawing	Drawing	Log book		
4		Tightening of pick up.	C	V	100%			Log book		
5		Cabling and termination from panel to local junction box.	C	V	100%	Drawing / Cable Schedule	Drawing / Cable Schedule	Log book		
6		Routing and clamping of cables.	C	V	100%	Drawing	Drawing	Log book		
7		Earthing of screen of field cables. . Megger.	C	M	100%	- Do -	- Do -	Log book		
		AUTOMATIC TURBINE RUN UP SYSTEM								
		SGC OIL SYSTEM								
1		Alarm and trip signals for operation.	B	V	100%	- Do -	- Do -	Log book		
		SGC CONDENSATE, EVACUATION SYSTEM & TURBINE RUN UP								
1		Alarm and trip signals for operation	B	V	100%	- Do -	- Do -	Log book		
		MATERIAL RECIPET/STORAGE/ ERECTION			FOR BHEL USE		DOC. NO.:			
SIGNATURE		AREA					REVIEWED BY		APPROVED BY	



BHEL JHANSI

RECORD OF QUALITY CHECKS

SHEET NO. OF QPI	CHECK No.	RESULTS ACHIEVED OK/NOT OK	DRAWING / DOCUMENT REFERENCE	FORMAT OF RECORD	INSPECTED BY SIGN. & DATE	CLEARED BY SIGN. & DATE	REMARKS

Note: Any protocol made is to be numbered & mentioned in %Format of Record+column.

PROJECT		SYSTEM	SUB-SYSTEM	AREA	QP NO.:
UNIT NO.					REV. No.01
RATING					LOG SHEET NO.: L-00
					SHEET: 01 OF 01



INSTRUMENT REG. NO./TAG NO.

BHEL JHANSI	DATE OF INSPECTION				
	DRAWING / DOCUMENT REF.				

RECORDING OF TEST PARAMETERS OF INSTRUMENTS AND SWITCHES

INSTRUMENT:		SERVICE:	
MAKE:	TAG No.:	Sr. No.	
ACCURACY:	RANGE:	TYPE:	
TEST INSTRUMENTS USED:			
TYPE:		RANGE:	
MAKE:		ACCURACY:	

*** 1) FOR INSTRUMENT:**

SL NO.	Reference Parameter	Instrument Reading / Measured Output	Deviation	Remarks

NOTE: USE CONTINUATION SHEET IF REQUIRED.

*** 2) FOR SWITCHES:**

SET VALUE:	OPERATED AT: a) Increasing
	b) Decreasing
HYSTERESIS:	

STRIKE OUT WHICHEVER IS NOT APPLICABLE

			NAME	SIG./DATE	DOC. NO. PN-QS-QPX-CI-048
PROJECT		INSPECTED BY			REV. NO. 01
UNIT NO.		CLEARED BY			LOG SHEET NO. L-01
RATING		CUSTOMER			SHEET: 01 OF 01